OzFinancial **Equity Research**

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# Northern Minerals Ltd - Special Report

**Price: A$0.0.085 | ASX: NTU | 3 January 2018**

**In our view, Northern Minerals (NTU) offers investors a unique proposition to leverage from the growth expected in electric vehicles (EVs) sales globally. While the world is fixated on lithium (with valuations of lithium-based companies already factoring in near perfect execution), investors need to appreciate (and should consider) the numerous other components which make up an electric vehicle. One such component is Dysprosium (Dy), with each EV requiring approximately 100 grams of the product. With increased penetration of EVs expected over the coming decades, we are of the view the proliferation of EVs (the cost benefit versus an internal combustion engine vehicle) could surprise on the upside. At the Company level, NTU is approximately 6 months away from commissioning its pilot plant and 9 months away from first product being shipped to the offtake partner. Therefore investors need to consider the NTU opportunity as a miner not just an exploration company. Whilst the next 6 months may represent some risks, we are of the view the reward is equally commensurate given over the course of next 12 months the company will be significantly de-risked.**

- **Company overview.** NTU is positioning itself to be the preeminent producer of dysprosium (heavy rare earth - HRE) outside of China. The Company owns rights to a large land holding in Western Australia (WA) and Northern Territory (NT) believed to be rich in dysprosium, with a portfolio of 3 projects: Browns Range (WA), John Galt (WA) and Boulder Ridge Project (NT). The Company's flagship project is the 100% owned Browns Range, where it has a number of deposits and prospects containing high value dysprosium and other HREs.

- **What is Dysprosium (Dy)?** As one of the 17 elements which make up the rare earth elements (REE) family, Dy is a key component in the production of ***NdDyFeB (neodymium dysprosium iron-boron)*** magnets used in clean energy (such as electric vehicles) and high technology solutions. Due to the increasing global demand for these applications, new Dy supply is critical to keep up with demand.

- **Sound corporate strategy, backed by a highly experienced team**. NTU's long-term strategy is to play in both light and heavy rare earths space. In the short-term management is taking a more focused approach to shareholder funds deployment by developing a pilot program at Browns Range. Management opted against building a full-scale operation (approx. cost $330m) given the current depressed price of the commodity and also as a risk mitigation strategy. Instead management opted to launch a pilot plant, which is 10% of full scale operation (approx. cost $40m). This will allow the management to de-risk the project, begin to generate cash flow from initial 3-year offtake agreement and apply the learning from pilot plant execution to the full scale build.

- **Supportive EVs thematic.** The global electric vehicle market passed the 2 million vehicles mark in 2016, after crossing the 1 million mark in 2015. According to International Energy Agency (IEA) assessments of country targets, original equipment manufacturer (OEM) announcements and scenarios on electric car deployment, the IEA estimate the number of electric vehicles will range between 9 million and 20 million by 2020 and between 40 million and 70 million by 2025.

## Company Data

**Market Cap:** A$73.9m

**Sector:** Basic Materials

**Industry:** Industrials Metals & Minerals

**52-week range: A**$0.081 – 0.15

**Shares Outstanding:** 797.96m

**Share Options & Performance Rights:** 72m.

**Free Float:** 268.96m

**ASX:** NTU

**Bloomberg:** NTU AU

**OzFin Risk Rating:** High

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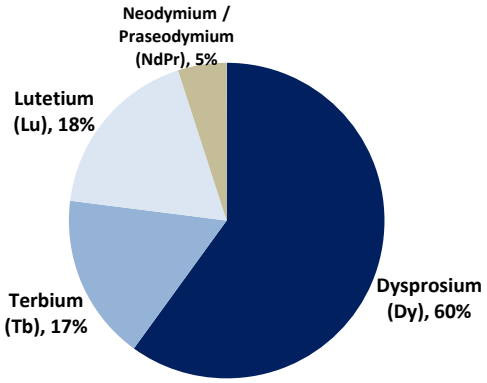
## Investment drivers…

**Electric vehicles (EVs) thematic – *"needs more than just lithium".*** Whilst much of the market's attention is focused on lithium's leverage to the expected growth in electric vehicles, investors also need to be cognizant that there are other components equally critical to this growth thematic - such as heavy rare earths. As the name suggests, ***NdDyFeB (neodymium dysprosium iron-boron) permanent magnets used*** by major electric vehicle manufacturers require dysprosium and terbium as key additives for high performance (figure 1). Each electric vehicle contains approximately 100g of Dysprosium. NTU is positioning itself to be the major producer of dysprosium outside of China, with 60% of the estimated revenue from NTU's Browns Range pilot plant expected to be generated by dysprosium (figure 2).

**Figure 1: Electric vehicle components**


Source: propurchaser.com

**Figure 2: Revenue mix of Browns Range pilot plant**

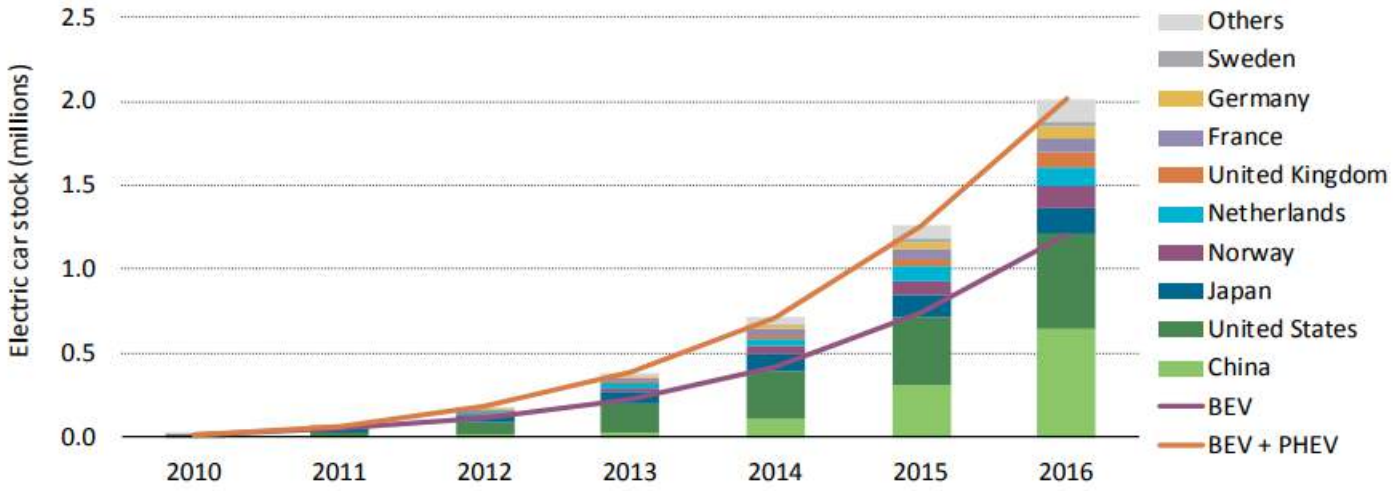



Source: NTU, BTIG

According to Statista, in 2015 the global demand for rare earths elements in permanent magnets for application in vehicles was approximately 12,500 metric tonnes (up from approximately 8,000 metric tonnes in 2010). According to Statista, this demand is expected to reach 18,500 metric tonnes by 2020 and 65,500 metric tonnes by 2025. This represents a compound annual growth rate (CAGR) of +18%.

**EV Market.** Put simply, it is hard to ignore or deny the inevitability of higher EV penetration in the future. We would argue this future is more imminent than what the market may be anticipating – it is not uncommon for the market to underestimate the pace of technological change/adoption. In 2016, new registrations of electric cars posted a new record. Norway is leading the world in terms of market share/penetration – currently estimated to be at 29%. The next country is considerably behind in electric vehicle adoption, with the Netherlands estimated to have approximately a 6.4% electric vehicle market share. Of the major populated countries, China, France and the UK all have electric vehicle market shares of approximately 1.5%. In 2016, China was the largest electric vehicle market, accounting for more than 40% of the electric vehicle cars sold in the world and more than double the amount sold in the US. The global electric vehicle market passed the 2 million mark in 2016, after crossing the 1 million mark in 2015. In our view, the penetration of electric vehicles will accelerate, driven largely by government mandates/policies and product investment / development by OEMs (original equipment manufacturers).

**Figure 3: Growth in global electric vehicle numbers**




Notes: The electric car stock shown here is primarily estimated on the basis of cumulative sales since 2005. When available, stock numbers from official national statistics have been used, provided good consistency with sales evolutions.

Source: IEA

**EV demand.** One of the major drivers of demand is changing policy settings by governments (in particular driven by European governments) and future development plans by global carmakers (OEMs). The table in figure 4 below provides a neat summary of recent announcements made by OEMs with respect to their plans for integrating EV models into their current line of models and growth outlook. For instance, the parent company of Mercedes-Benz (Daimler AG) plans to offer EV version of all their cars by 2022 and spending $1bn to build EVs in the US.

**Figure 4: List of OEMs announcement on electric vehicles ambition**

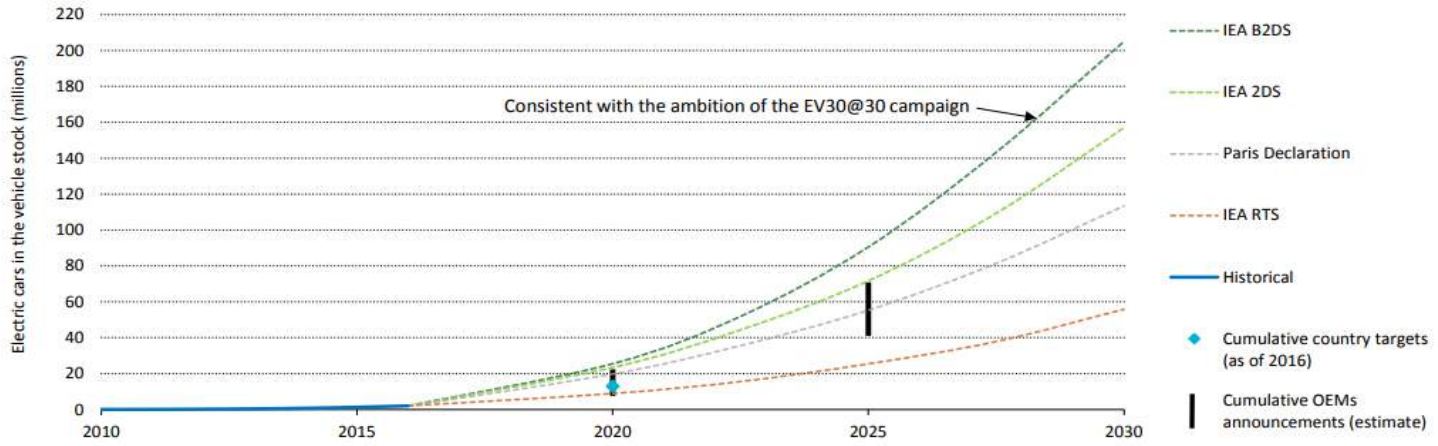
| OEM | Announcement | Source |
|---|---|---|
| BMW | 0.1 million electric car sales in 2017 and 15-25% of the BMW group's sales by 2025 | Lambert (2017b) |
| Chevrolet (GM) | 30 thousand annual electric car sales by 2017 | Loveday (2016) |
| Chinese OEMs | 4.52 million annual electric car sales by 2020 | CNEV(2017) |
| Daimler | 0.1 million annual electric car sales by 2020 | Daimler (2016a) |
| Ford | 13 new EV models by 2020 | Ford (2017) |
| Honda | Two-thirds of the 2030 sales to be electrified vehicles (including hybrids, PHEVs, BEVs and FCEVs) | Honda (2016) |
| Renault-Nissan | 1.5 million cumulative sales of electric cars by 2020 | Cobb (2015b) |
| Tesla | 0.5 million annual electric car sales by 2018<br>1 million annual electric car sales by 2020 | Goliya and Sage (2016), Tesla (2017a) |
| Volkswagen | 2-3 million annual electric car sales by 2025 | Volkswagen (2016) |
| Volvo | 1 million cumulative electric car sales by 2025 | Volvo (2016) |

Note: Chinese OEMs include BYD, BJEV-BAIC Changzhou factory, BJEV-BAIC Qingdao factory, JAC Motors, SAIC Motor, Great Wall Motor, GEELY Auto Yiwu factory, GEELY Auto Hangzhou factory, GEELY Auto Nanchong factory, Chery New Energy, Changan Automobile, GAC Group, Jiangling Motors, Lifan Auto, MIN AN Auto, Wanxiang Group, YUDO Auto, Chongqing Sokon Industrial Group, ZTE, National Electric Vehicle, LeSEE, NextEV, Chehejia, SINGULATO Motors, Ai Chi Yi Wei and WM Motor.

Source: IEA, as at April 2017

**EV outlook.** Given the interest in the sector, there are numerous estimates of what the EV market size may morph into over the short-term and long-term. We have used the estimates provided by International Energy Agency (IEA), which has been driven by extensive analysis of EV country submissions and drawing data from other leading industry bodies. According to IEA's assessments of country targets, original equipment manufacturer (OEM) announcements and scenarios on electric car deployment, the IEA estimate electric vehicle numbers will range between 9 million and 20 million by 2020 and between 40 million and 70 million by 2025.

**Figure 5: IEA electric vehicles growth projections**

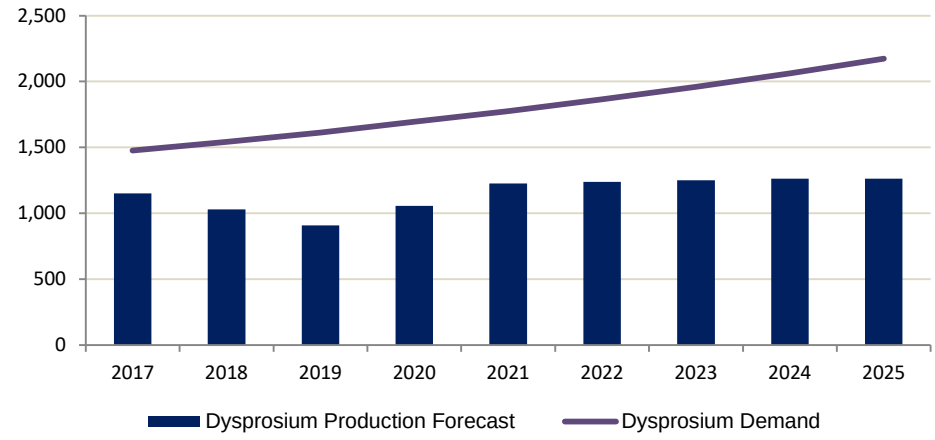



Source: IEA

Notes: The Reference Technology Scenario (RTS) incorporates technology improvements in energy efficiency and modal choices that support the achievement of policies that have been announced or are under consideration. The 2DS is consistent with a 50% probability of limiting the expected global average temperature increase to 2 degree Celsius. The B2DS falls within the Paris Agreement range of ambition, corresponding to an average increase in the global temperature by 1.75 degrees Celsius.

**Dysprosium supply.** According to Adamus Intelligence (excluding NTU's Browns Range), in 2025 the gap between estimated dysprosium demand (2,174 tonnes) and estimated dysprosium production (1,263 tonnes) is expected to increase to 911 tonnes (from 513 tonnes in 2018). Further, we note this gap does not take into consideration the accelerated EV demand curves noted above.

**Figure 6: Dysprosium demand / supply forecast**




Source: Adamus Intelligence, NTU, BTIG

**China drives global supply of REE (including heavy rare earths).** The global production of rare earth elements (REE) was approximately 128,000 metric tonnes in 2016, which was mainly comprised of China (82%) and Australia (11%).

**Figure 7: Global REE production in 2016**

| (metric tonnes) | Mine Production | | %Global | Reserves | %Global |
|---|---|---|---|---|---|
| | 2015 | 2016 | | | |
| United States | 5,900 | 0 | 0% | 1,400,000 | 1% |
| **Australia** | **12,000** | **14,000** | **11%** | **3,400,000** | **3%** |
| Brazil | 880 | 1,100 | 1% | 22,000,000 | 18% |
| Canada | 0 | 0 | 0% | 830,000 | 1% |
| **China** | **105,000** | **105,000** | **82%** | **44,000,000** | **36%** |
| Greenland | 0 | 0 | 0% | 1,500,000 | 1% |
| India | 1,700 | 1,700 | 1% | 6,900,000 | 6% |
| Malaysia | 500 | 300 | 0% | 30,000 | 0% |
| Malawi | 0 | 0 | 0% | 136,000 | 0% |
| Russia | 2,800 | 3,000 | 2% | 18,000,000 | 15% |
| South Africa | 0 | 0 | 0% | 860,000 | 1% |
| Thailand | 760 | 800 | 1% | | 0% |
| Vietnam | 250 | 300 | 0% | 22,000,000 | 18% |
| **Global** | **131,805** | **128,216** | | **121,056,000** | |

Source: USGS, BTIG

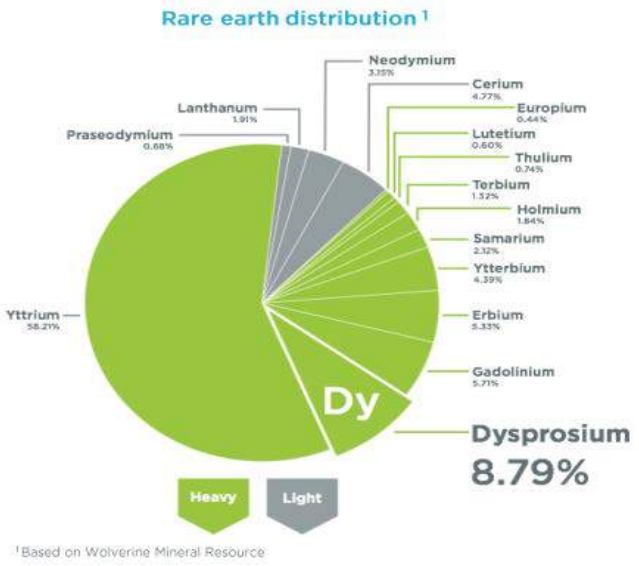
**Illegal Chinese supply.** The stamping out of illegal production of REE in China could be a significant positive catalyst for the industry, with the government already taking measures to regulate the supply. Carried out mainly in Southern China, it is estimated that the illegal production is above 20% of the legal production in China. The illegal production in China (whether it is trading with an expired licence or backyard operations), among other things, is also having significant environmental impacts. Illegal miners have disposed mine tailings – including ammonium sulphate and other materials – into local waterways. This has led to the contamination of farm fields and water supplies of local farmers downstream.

**China curb.** China has looked to curb illegal exploration and sales by consolidating the industry into six large groups: China Northern Rare Earth, China Southern Rare Earth, Chinalco Rare Earth, Xiamen Tungsten, China Minmetals and Guangdong Rising. China plans to further regulate and consolidate its rare-earth industry by raising barriers to entry on producers and capping output. The full-year production quota for rare-earth oxides for 2017 is 105,000 metric tonnes, with 98% allocated to the large rare-earth groups. According to the Ministry of Land and Resources, allocated quota for each producer cannot be transferred to companies. Further, in our view China is trying to stamp out non-state-owned and small-scale miners to regain pricing power.

**New rare earth mines lack heavy metals used in electronics.** According to the United States Geological Survey (USGS), supplies of some rare earths will not increase with new mine development. The new mines at Mountain Pass (California)

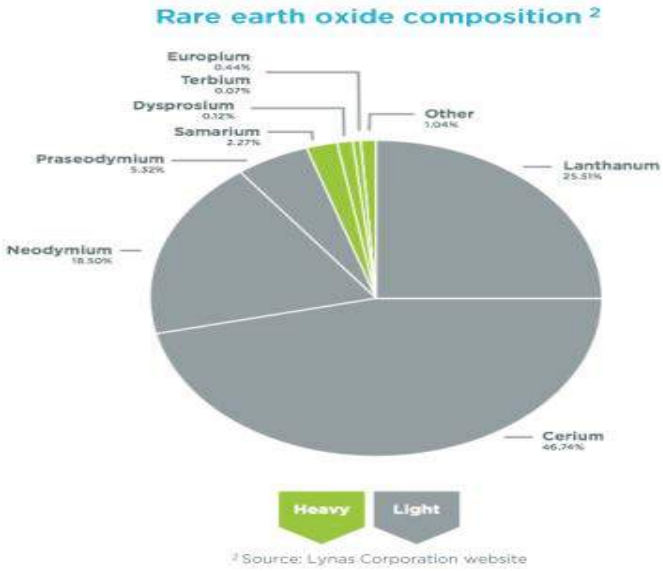
and Mount Weld (Australia) are richer in light and medium rare earths than heavy rare earths such as yttrium and dysprosium – which are critical to the electronics and telecom industries. As the charts in figure 8 and 9 below highlight, NTU is predominantly weighted towards heavy rare earths. In contrast, the composition of Lynas' Mount Weld project (biggest producer of REE outside of China) is predominantly light.

**Figure 8: Northern Minerals' Browns Range**




Source: NTU

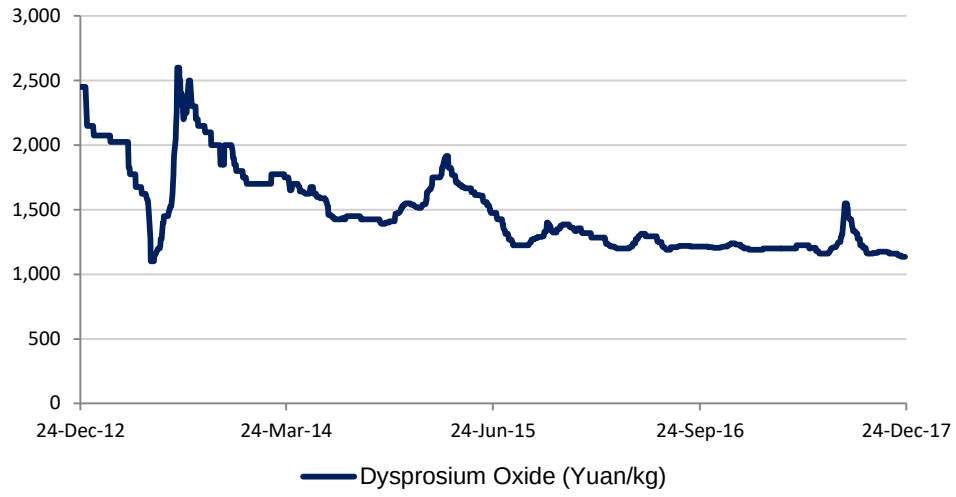
**Figure 9: Lynas' Mount Weld**




Source: NTU

**Healthy demand outlook should see prices move off from current lows.** In short, over the last 5 years, the boom and bust of rare earth prices was driven by China.

**Figure 10: Dysprosium price**




Source: Bloomberg, BTIG

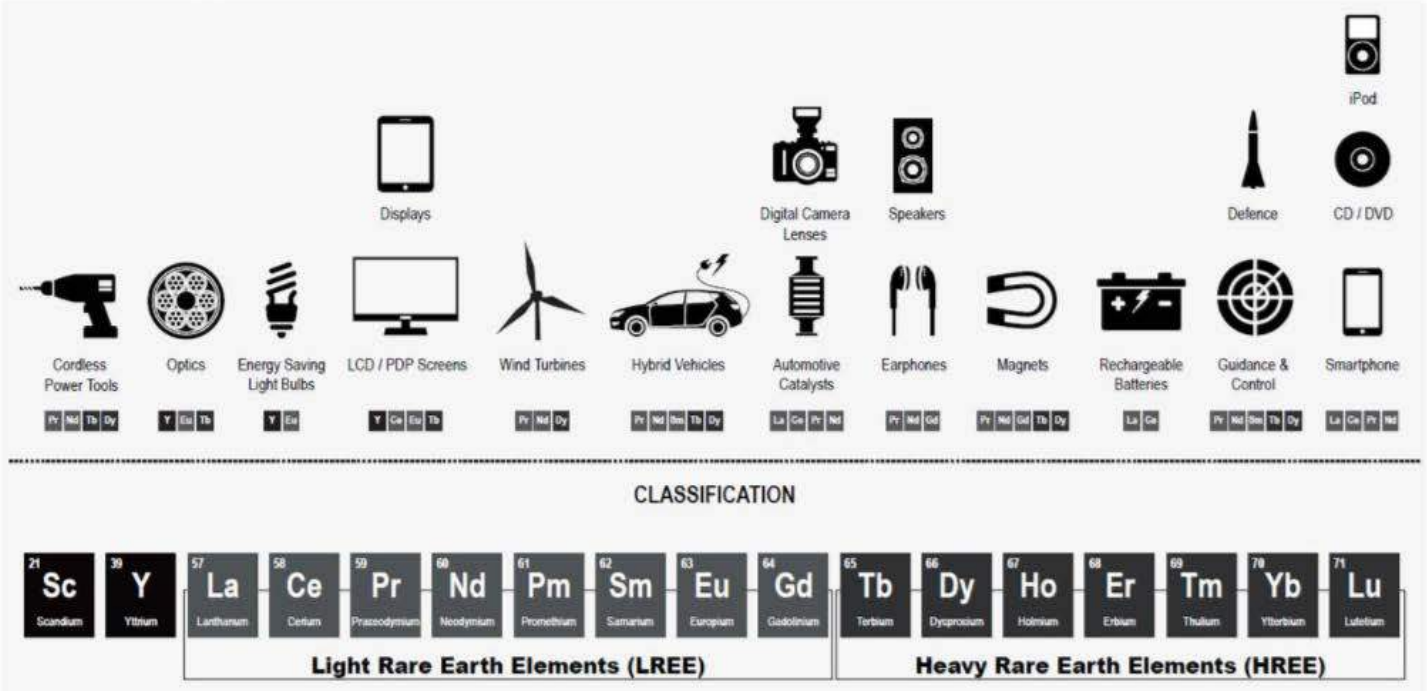
China cut exports to curb illegal production which drove prices higher. This only drove supply – official and unofficial – higher to take advantage of higher prices. However, after challenges from World Trade Organisation and other countries in regards to China's export cuts, China had to reverse this decision and has been steadily increasing its REE exports. However, the excess supply during the price boom has kept the price low over the past 5 years. As noted above, China is clamping down on illegal production and has looked to consolidate the industry. Positive developments on this front have recently seen the price of praseodymium (Pr) and neodymium (Nd) spike in 2017. In our view, solid and growing demand for rare earths elements will see it being reflected in the price.

## Rare Earths Elements (REE) – Quick overview…

The International Union of Pure and Applied Chemistry define REE as a group of 17 elements comprising the 15 elements in the lanthanide group, plus scandium and yttrium.

**Everything from electric vehicles to smartphones**. Rare earths are used in key components for a wide variety of products, including electronics, hybrid vehicles and energy-storage systems. They can be made into mini-magnets fitted into items such as smartphones. Further, rare earths can also be used as catalysts to speed up refining, such as converting crude oil into gasoline. Invariably, the demand for rare earths is dependent on the growth in production of these downstream products.

**Figure 11: Rare earths - applications & elements**




Source: China Water Risk Report

**Light versus heavy REE.** Based on the structure of electron shell, REE can be categorized into light earth elements (LREE) and heavy rare earths elements (HREE). According to US Geological Survey (USGS), Lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium and gadolinium are LREEs, while terbium, **dysprosium**, holmium, erbium, thulium, ytterbium and lutetium make up HREEs. Additionally, given their similarity to REE scandium and yttrium are generally considered as REE. Yttrium is classified as a HREE since its shares similar properties with other elements belonging to HREEs.

REE are relatively abundant in the upper part of the Earth's crust but the metals' scattered distribution globally makes many extraction projects uneconomical. While rare earths have a variety of uses, processing has proven to be financially and environmentally costly.

## Company Overview…

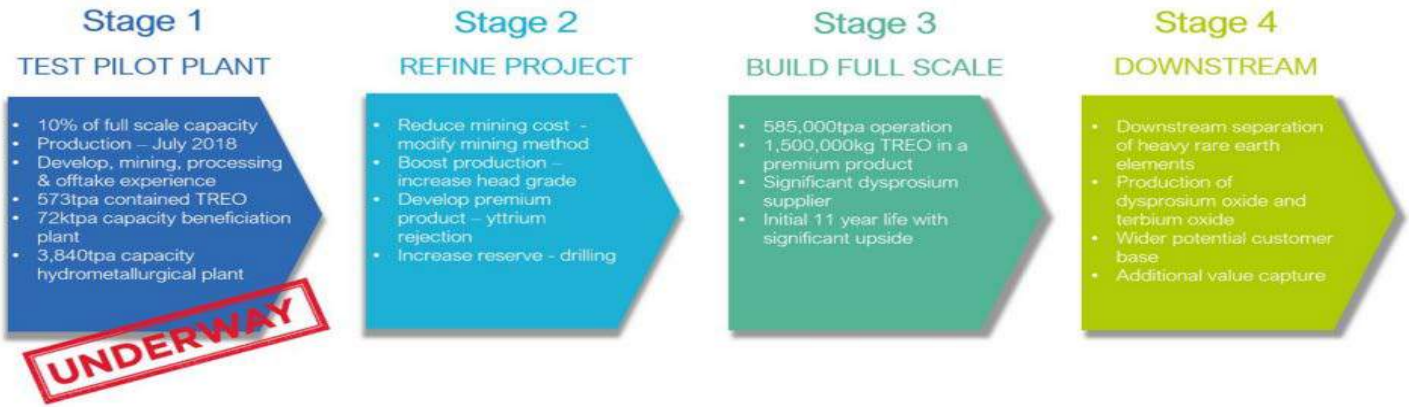
Northern Mineral Ltd (NTU) is positioning itself to be the preeminent producer of dysprosium (heavy rare earths or HREs) outside of China. The Company owns rights to a large land holding in Western Australia (WA) and Northern Territory (NT) believed to be rich in dysprosium, currently with a portfolio of 3 projects: Browns Range (WA), John Galt (WA) and Boulder Ridge Project (NT). The Company's flagship project is the 100% owned Browns Range (located 160km south east of Halls Creek in northern Western Australia), where it has a number of deposits and prospects containing high value dysprosium and other HREs. While both the John Galt and Boulder Ridge projects are in their early stages of exploration, both are indicating similar mineralization to the Browns Range Project and provide NTU with critical future growth options.

**Figure 12: NTU Projects**


Source: NTU

**Strategy.** Management's strategy can be best summarized by the diagram in figure 13 below, which involves four stages. It is worth noting that Stage 4 was only recently reinvigorated by management in December 2017 after interest from permanent magnet producers looking to contract long-term, reliable supply of heavy rare earth oxides.

**Figure 13: NTU corporate strategy – path to prosperity**




Source: NTU

**Stage 1 – Test Pilot Plant.** This stage includes the construction of a 3-year 60ktpa pilot plant operation. It will consist of an open cut mining operation, with processing via a beneficiation and hydrometallurgical pilot plant to produce 49,000kg of dysprosium in 590,000kg TREO contained in a mixed RE carbonate p.a. This stage is important to de-risk the operations by testing the process, and improving knowledge of grade control and the Project's geology.

In 2015 management decided against building a full scale operation (approx. cost $320m) given where the price of the commodity was at the time (and still is at recent lows) and the fact NTU's market capitalization does not justify this amount of capital expenditure. Instead, management opted to launch a pilot plant, which is 10% of full scale operation and will cost approx. cost $40m. Whilst operating at 10% of full scale means NTU loses the benefits of economies of scale, the Company believes there are two offsetting factors: **(1)** NTU's ore body at surface has a higher grade naturally (70% better grade for the pilot plant than long-term plant); and **(2)** the pilot plant is eligible for research and development funding (43 cents in the dollar spend on capex & opex will be funded by the government – life to date NTU has received $27m back from the government). In 2017/18, NTU expect to receive $25m.

In our view, investors shouldn't discount the potential upside from the pilot plant itself. The pilot has 72ktpa capacity at the front end, with the Company looking to produce 60ktpa, factoring in 2 months worth of downtime given the remoteness of the plant and weather related impacts. Should infrastructure upgrades (roads etc) come through in the region, the Company is likely to see production upgraded to around 66ktpa. This then has a positive flow on impact on storage / working capital requirements. In our view the Company could produce above its nameplate capacity by 10%, approaching 80ktpa.

The Company expects to finish the build of the pilot plant by 30 June 2018, with first product of shipment will take place in September 2018 quarter. All of the Pilot Plant production is being sold to JFMAG under an offtake agreement for the three-year Pilot

Plant project. These two events are likely to be significant share price catalysts for the NTU's share price.

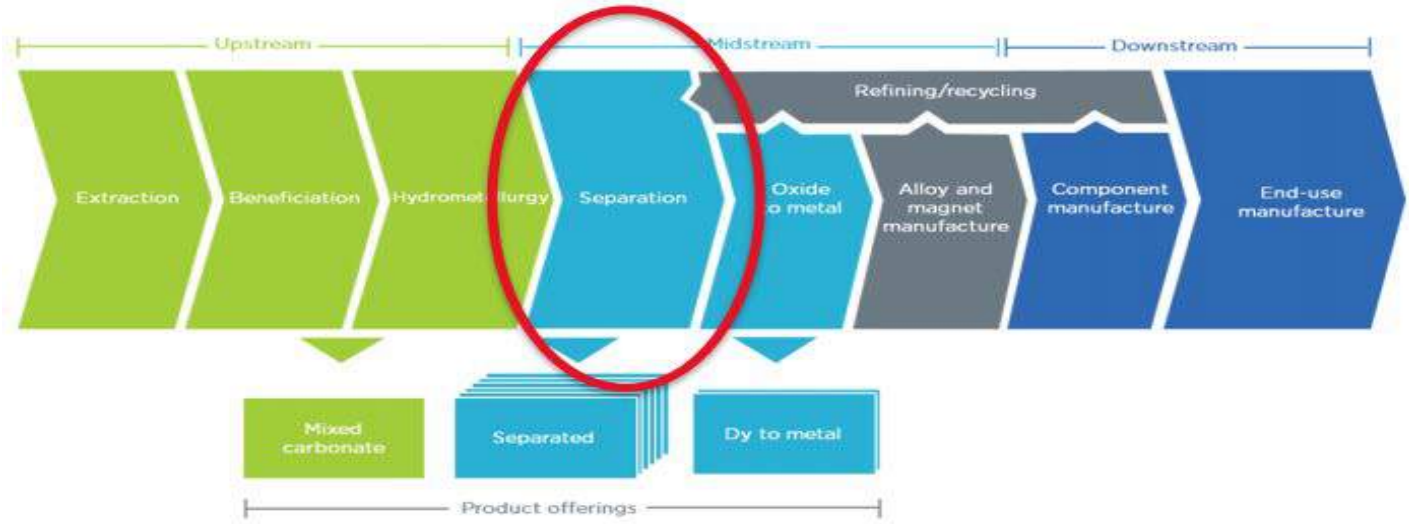
**Stage 2 – Refine Project.** This stage involves developing the Project to BFS level based on the Definition Feasibility Study (DFS) completed in March 2015 and the results of the studies, announced 27 August 2015, aimed at reducing mining costs, boosting production, producing a premium product and increasing the Ore Reserve.

**Stage 3 – Build Full Scale.** This stage involves building the project to full scale production based on the successful outcomes of stage one and two. Once at full scale the project will process 585,000tpa to produce 279,000kg of dysprosium, contained within 3,098,000kg TREO p.a. (prior to yttrium rejection), in a mixed RE carbonate. NTU's Browns Range project currently has an 11-year mine life under JORC, with the Company looking to commence exploration efforts in 2018 to add an additional 9 years of JORC resources (that is, extend mine life to more than 20 years). The Company has previously announced that it has identified 170 targets along the John Galt and Boulder Ridge for exploration activity.

Growing the resource base is critical in our view, given permanent magnet producers will be looking to lock in supply on long-term contracts of at least greater than 15 years. In our view, NTU is attractively positioned to pick up long-term contracts should new exploration targets provide positive results, given the current supply is largely consolidated in China and permanent magnet producers' desire to diversify the supply base.

**Stage 4 – Downstream.** NTU is exploring downstream processing options, which makes significant strategic sense, in our view. As it stands today, the Pilot Plant will produce a mixed heavy rare earth carbonate containing both dysprosium and terbium as revenue products. With the current offtake agreement, the offtake partner prices the shipment for 5 of the 6 components at the separation stage (figure 14 below), given there is no market for carbonate in Australia. The other elements in the mixed heavy rare earth carbonate are used by the offtake partner to pay for their separation cost.

**Figure 14: Permanent magnets supply chain**




Source: NTU

The Company has noted that it has received approaches from permanent magnet producers in the US, Europe, South Korea and Japan with respect to the potential for sale of separated rare earth oxide products from NTU's potential large-scale project. This will include dysprosium oxide, terbium oxide, neodymium and praseodymium as well as the potential for the separation of other heavy rare earths. As highlighted previously in this report, we believe permanent magnet producers are looking to diversify away from China, where much of the supply is consolidated at the moment.

NTU is currently in discussions with potential licensing partners for downstream processing technologies as well as looking at potential sites for a downstream processing operation.

**Strategic M&A to supplement future growth.** NTU's management is currently assessing M&A opportunities in the rare earth sector that are complementary to the Browns Range Project and focused on the light rare earth sector (projects focused on neodymium (Nd) and praseodymium (Pr)). In our view, given the depressed rare earth prices and generally weak sentiment towards the sector, now would be the ideal time to assess potential M&A opportunities (as opposed to the top of the cycle). In our view, given the long-term positive drivers for electric vehicles and China clamping down on illegal mining, prices are likely to rise from current levels in the future.

**Potential merger between Lynas Corp (LYC) and Northern Minerals (NTU)?** We believe so. Lynas, with a market cap of A$1.2bn, is the front runner in the rare earths space and largest producer outside China. As previously highlighted in figure 8 and 9, NTU is weighted towards heavy rare earths, whereas Lynas is predominantly light rare earths. 99% of heavy rare earths production comes out of China, while Lynas is making the breakthrough of light rare earths production outside of China. We would not consider NTU as a direct competitor to Lynas, but rather an enabler for Lynas as Lynas is unable to offer all of the rare earths elements outside of China. For this reason, we believe the potential tie-up between the two firms cannot be fully discounted.

**Figure 15: ASX-listed REE players**

| | Current Price | Share Price Performance | | | | Market Cap ($m) |
|---|---|---|---|---|---|---|
| | | 1-day | 1-month | 6-month | 1-year | |
| NORTHERN MINERALS LTD | 0.09 | 0.0% | -15.0% | -19.0% | -29.2% | $74 |
| ALKANE RESOURCES LTD | 0.33 | -4.3% | -1.5% | 37.5% | -2.9% | $167 |
| ARAFURA RESOURCES LTD | 0.11 | 4.8% | 4.8% | 83.3% | 83.3% | $63 |
| GREENLAND MINERALS & ENERGY | 0.10 | 0.0% | 0.0% | 0.0% | 49.3% | $111 |
| HASTINGS TECHNOLOGY METALS L | 0.37 | -1.4% | 15.9% | 305.6% | 400.0% | $245 |
| LYNAS CORP LTD | 2.24 | 0.0% | 17.3% | 94.8% | 211.1% | $1,263 |
| PEAK RESOURCES LTD | 0.06 | 3.6% | 7.4% | 1.8% | -12.1% | $36 |

Source: BTIG, Bloomberg; price 3-Jan-18 11am AEST

**Browns Range mineral resources.** The latest indicated and inferred mineral resources are provided in the table in the figure 16 (below). The key take away from this table is the total mineral resource estimate of 8.98 million tonnes at 0.63% total rare earth oxides (TREO) made up of six deposits – Wolverine, Gambit West, Gambit, Area 5, Cyclops and Banshee. ***More importantly, Browns Range exhibits significantly high grade concentration of heavy rare earth oxides (HREO) of 87%.***

**Figure 16: Browns Range mineral resources**

| Deposit | Category | Mt | TREO | $Dy_2O_3$ | $Y_2O_3$ | $Tb_4O_7$ | HREO | TREO |
|---|---|---|---|---|---|---|---|---|
| | | | % | Kg/t | Kg/t | Kg/t | % | Kg |
| Wolverine | 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[1] | 4.97 | 0.86 | 0.74 | 4.97 | 0.11 | 89 | 42,560,000 |
| Gambit West | Indicated | 0.27 | 1.26 | 1.07 | 7.06 | 0.14 | 90 | 3,424,000 |
| | Inferred | 0.12 | 0.64 | 0.54 | 3.67 | 0.07 | 85 | 753,000 |
| | Total[1] | 0.39 | 1.07 | 0.91 | 6.04 | 0.12 | 89 | 4,177,000 |
| Gambit | Indicated | 0.05 | 1.06 | 0.92 | 6.62 | 0.12 | 97 | 533,000 |
| | Inferred | 0.06 | 1.2 | 1.01 | 6.8 | 0.15 | 95 | 671,000 |
| | Total[1] | 0.11 | 1.13 | 0.97 | 6.72 | 0.13 | 96 | 1,204,000 |
| Area 5 | Indicated | 1.38 | 0.29 | 0.18 | 1.27 | 0.03 | 69 | 3,953,000 |
| | Inferred | 0.14 | 0.27 | 0.17 | 1.17 | 0.03 | 70 | 394,000 |
| | Total[1] | 1.52 | 0.29 | 0.18 | 1.26 | 0.03 | 69 | 4,347,000 |
| Cyclops | Indicated | - | - | - | - | - | - | - |
| | Inferred | 0.33 | 0.27 | 0.18 | 1.24 | 0.03 | 70 | 891,000 |
| | Total[1] | 0.33 | 0.27 | 0.18 | 1.24 | 0.03 | 70 | 891,000 |
| Banshee | Indicated | - | - | - | - | - | - | - |
| | Inferred | 1.66 | 0.21 | 0.16 | 1.17 | 0.02 | 87 | 3,484,000 |
| | Total[1] | 1.66 | 0.21 | 0.16 | 1.17 | 0.02 | 87 | 3,484,000 |
| Total[1] | 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[1]** | **8.98** | **0.63** | **0.53** | **3.56** | **0.08** | **87** | **56,663,000** |

[1] – Rounding may cause some computational discrepancies (TREO (metal) tonnes estimated from Mt x TREO%)

Source: NTU

**Financing – Pilot Plant.** NTU's financing arrangement for its stage 1 Pilot Plant consists of the following main sources: **(1) $38m R&D financing facility.** R&D financing is obtained out of New York, with US debt investors providing expected R&D rebates from the government in advance for working capital requirements. **(2) $10m sales agreement prepayment**. NTU's offtake partner will make $10m prepayment, which will come in the March quarter of 2018 calendar year. Additionally offtake partner has been issues 40 million unlisted options at $0.25 exercise price. **(3) $11m Sinosteel deferred payment.** Contractor Sinosteel has deferred 20% of its contract amount for 24 months, with the ability to convert into NTU shares. **(4) $14m Lind financing facility. (5) Placements of $34m**

The Company has also recently announced a Share Purchase Plan (SPP) with the view of raising up to $5m, which will go towards funding downstream processing and increased focus on exploration opportunities to increase mine life.

## Company Management…

We highly regard the management team of NTU and their past experience in delivering similar projects – that is, scope study to operations. This experience is particularly critical, in our view, given the execution risk associated with NTU's flagship Browns Range Project. Below we have provided the bios of key members of the team (source NTU website).

**Non-executive Chairman – Colin McCavana.** Mr McCavana has more than 35 years of management experience gained working across the globe in acquisitions, development and operation of mining and mineral recovery projects. He was formerly the Managing Director of Haddington Resources and Non-executive Director of Polaris Metals.

**Managing Director / CEO – George Bauk.** Mr Bauk has more than 25 years' experience, previously holding global operational and management positions with WMC Resources, Arafura Resources and Western Metals. Mr Bauk experience consists of strategic management, business planning, finance and capital/debt raising and previous experience with rare earths and nickel. Since joining the Company in 2010 as Managing Director, Mr Bauk has rapidly progressed NTU from a greenfields heavy rare earth explorer to imminent production of high value dysprosium outside of China.

**Chief Financial Officer (CFO) / Company Secretary – Mark Tory.** Mr Tory has 25 years' experience in the mining industry and accounting professions. Previously he held management positions with Crescent Gold Ltd, Anglo American Exploration and Homestake Gold(now Barrick Gold) and Deloittes (within the Audit Division looking after mining and resources industry clients).

**Exploration Manager – Robin Wilson.** Mr Wilson has more than 20 years' experience in mineral exploraiton, including Polaris Metals, Tanganyika Gold, Troy Resources and spent 5 years working in oil and gas exploration for Woodside Energy. Mr Wilson has gained experience across gold, nickel, copper, rare earths elements and uranium projects in Western Australia and Africa and was involved in the initial discovery and outlining of several gold deposits.

**Chief Operating Officer (COO) – Robin Jones.** Mr Jones has over 20 years experience in the mining industry, including the assessment and development of resource projects from scoping study level through to operation. Mr Jones has experience in PGM, nickel, copper, gold and uranium projects in Australia, South Africa and China with companies including Mega Uranium, CopperCo, Aquarius Platinum and Impala Platinum.

# OzFinancial Research – Northern Minerals

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