

THE GLOBAL RARE EARTH ELEMENTS MARKET

UPDATE NOTE

27.11.2020

Review of Initial Investment Thesis, published July 2017

This brief Update Note on the rare earth elements ('REE') industry should be read as a follow-on from our industry commentary published in July 2017, entitled "Rare Earth Elements: Time to Invest?"

<https://aimchaos.com/category/misc-commentary/>

The thesis of our research note on the REE industry, published in July 2017, was as follows:

"The supply / demand dynamics of the global REE industry are set to become imbalanced, owing to quasi-monopolist China curbing domestic production, and to the rapidly accelerating global adoption of renewable energy technologies that utilise REEs. We are of the opinion that the approaching market imbalance will ultimately be corrected by the fast-tracking into production of ex-China REE deposits. As such, we believe that investors should be positioning themselves for the impending recovery in the rare earths sector by investing in late stage REE projects that possess mineralisation geared towards renewable energy applications."

In summary, we hypothesised that:

- i) China would curb overall production to preserve its national reserves, whilst also cracking down on rampant illegal mining of heavy rare earths in the southern provinces;
- ii) No new supply of REEs would come online from Rest of World ('RoW') sources for at least two years, owing to a dearth of construction ready, pre-production projects;
- iii) Simultaneously, demand would increase rapidly for the Magnet REEs ('MREE') (neodymium, praseodymium, dysprosium and terbium), owing to the acceleration of the rollout worldwide of two key green technologies, namely electric vehicles ('EV') and wind turbines;
- iv) Demand for such projects would be further fuelled by a political drive: namely, for RoW governments to establish secure, non-Chinese, sources of REEs, given that the MREEs are used in numerous military applications and thus are considered a matter of national security;
- v) Prices of MREEs (especially neodymium and praseodymium) would sustain their price increases seen in H2 2017;
- vi) Both Chinese and RoW companies and governments would seek out and invest in (or acquire) ex-China, high quality REE deposits that are advanced (post pre-feasibility study, at the minimum) and ideally whose ore bodies are comprised of a high percentage of MREEs.

As we discuss in detail below, our thesis has been partially correct – although there have been ups and downs in each of those hypotheses playing out over the past three years. Critically, demand for REEs – notably, MREEs that are used in permanent magnets, which are themselves integral components in the traction motors of EVs, and the generators of wind turbines – has been increasing rapidly. Moreover, RoW governments have been seeking to establish ex-China REE sources with considerable urgency. As a result, we have seen investment from RoW nations *and* China (who we believe are eager to retain power over the global market) in ex-China REE projects. On the other hand, China has *increased* its official REE output quota, which appears to have offset its efforts in stamping out illegal mining. Furthermore, significant RoW supply has come online sooner than we had anticipated (via MP Materials' Mountain Pass mine). Accordingly, it is only in H2 2020 that prices of the MREEs have pushed beyond H2 2017 levels. This time, however, we expect the price rise to be sustained.

Developments within the global REE industry, July 2017 to November 2020

Below, we briefly detail how the six core hypotheses made within our 2017 thesis on the REE industry have played out over the past three years:

i) China

For the three years from 2015 to 2017, China had limited its ‘official’ REE production to 105 thousand tonnes per annum (‘ktpa’). Our thesis was that China would not increase this annual production cap, and in the meantime stamp out illegal mining in the country (that was estimated to be in the region of 44,000 tonnes in 2016). Whilst illegal mining has indeed been reportedly curbed by approximately 50% from late 2018 onwards when the government started combatting it in earnest,¹ *official* production has in fact been ramped up. In 2018, output increased by 14.3%, to 120,000 tonnes; and in 2019, it increased by a further 10%, to 132,000 tonnes.² This year, the government has increased the production cap gain, by 6.1% to 140,000 tonnes.³

We could therefore surmise that *overall* production within China (both legal and illegal) has increased only modestly – by 10,000-15,000 tonnes in total – between 2017 to now.

However, it is important to note that despite this production increase, Chinese REE exports have fallen heavily this year. From January to August, exports fell 25.7% year-on-year to 24,377 tonnes.⁴ It will be interesting to see whether this was primarily a result of a decrease in overseas orders owing to the coronavirus pandemic, or of increased demand from domestic industries (especially the EV manufacturing industry in China).

ii) RoW production

Besides China, the only nation that has increased production substantially since 2017 is the US. This was due to the massive Mountain Pass mine in California recommencing operations in Q1 2018, having been on care and maintenance since late 2015 when former owner, Molycorp, fell into administration. [In June 2017, the mine and processing facility were acquired by a consortium that included Chicago hedge fund JHL Capital Group, New York-based financial group QVT Financial LP, and Chinese REE company Shenghe Resources Holding Co.] In 2018, Mountain Pass produced 18,000 tonnes of REE concentrate; last year, output increased to 28,000 tonnes. This year, it is on track to produce in excess of 36,000 tonnes – equating to an additional 27.7% on the total (legal) global production recorded in 2017 of 130,000 tonnes.

Late stage, RoW developers that we believe have a realistic chance of bringing their mines online within the next 2-3 years include:

- Arafura Resources
- Pensana Rare Earths
- Mkango Resources
- Peak Resources (contingent on Tanzania becoming more amicable to foreign mining companies)
- Northern Minerals (although the deposit is comprised of predominantly heavy rare earths)

N.B. none of these companies have yet secured project finance.

¹ hallgartenco.com/pdf/RareEarths/REE_Outlook_June2019.pdf - p.4

² pubs.usgs.gov/periodicals/mcs2020/mcs2020.pdf

³ uk.reuters.com/article/us-china-rareearths/china-raises-annual-rare-earth-mining-quota-to-record-high-in-2020-idUKKCN24H1J8

⁴ spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/analysts-expect-china-s-fy-20-rare-earth-exports-to-drop-yoy-60277927

iii) Increase in global demand for MREEs

a. The electric vehicle revolution

As we detailed in our 2017 research note, global sales of EVs amounted to 0.77m units in 2016. That was up from 0.21m units in 2013, equating to a CAGR of 54% over the 3-year period.

In 2019, global sales amounted to 2.21m – almost *three times* the amount sold only three years earlier. The CAGR over the period from end 2016 to end 2019 was therefore 42% – and universal consensus is that this fundamental shift in the global automobile industry from internal combustion engine (‘ICE’) to EV will only accelerate over the next decade. Most major car manufacturers have now set themselves specific dates by which point they intend to have their fleets fully electrified; whilst governments across the globe are also accelerating plans to ban ICE vehicles (the UK government, for example, has twice this year brought forward its intended ban on ICE vehicles – firstly from 2040 to 2035 in February; and then from 2035 to 2030 this month).

b. The continued global rollout of wind turbines

Global cumulative installed wind capacity as at end 2016 amounted to 487 gigawatts (‘GW’). As at end 2019, it had increased to 651 GW, equating to a CAGR of 10.1% over the 3-year period. 2020 was expected to be a record year for wind energy, with the Global Wind Energy Council forecasting 76 GW of new capacity (11.7% annual growth). However, the coronavirus pandemic has ensured that this growth is unlikely to be met. Nevertheless, the outlook for global growth in wind energy over the next 2-3 decades remains very bullish.

iv) Political tugs of war between nations over MREEs

In our 2017 thesis, we wrote the following (p.38):

“The move by RoW players to gain secure supplies of REEs from outside of China seems economically sensible, in light of how China was able to shift global prices by many multiples in 2010/11, simply by flexing its muscles. It must also be noted that in a political sense – taking into account the variety of military applications that REEs are utilised in – the move also would appear not simply wise but of fundamental importance. After all, a secure supply of REEs is nowadays undisputedly essential to the national security of a nation...

...China will continue to hold a key competitive advantage over RoW players, namely cost of extraction (and this is likely to be held for the foreseeable future, until such time as the RoW players make a collective effort to invest substantially in all aspects of the REE supply chain). However, it is vital for investors to remember that cost alone doesn’t make up the entire picture for RoW players. Owing to the underlying presence of global politics within the REE industry, it may be that with regards to the development of RoW deposits, security of supply is of primary importance, and cost of extraction – whilst important – is not the deciding factor when it comes to decision to mine.”

Since the publication of our thesis, the politicisation of the REE industry has been a hot topic in international media on several occasions. It has primarily arisen as a result of the ongoing trade war between the US and China. This commenced in 2018 when President Trump began setting tariffs and other trade barriers on China, with the goal of forcing it to make changes to what the US claimed were ‘unfair trade practices’.

In May 2019, the Pentagon briefed Congress on a report on REEs as it looked to reduce American reliance on China, amid mounting concern in Washington about Beijing’s role as a supplier. It flagged its concerns that China was seriously considering restricting REE exports to the US, as retaliation to the economic sanctions that the US had been imposing. The report suggested rapidly developing a domestic mining *and processing* industry.

In April this year, the Pentagon provided Australia’s Lynas Corp (owner of the Mt Weld mine), and California-based MP Materials (owner of the Mountain Pass mine), with funding to develop and construct rare earths separation facilities in Texas and California, respectively. However, the decision

was quickly reversed, when it was reported by the media that Chinese REE company, Shenghe Resources Holding Co, held a 9.9% stake in MP Materials. Although the provision of funding by the Pentagon to both companies was subsequently reinstated, the saga demonstrates just how politically sensitive securing a non-Chinese supply of rare earth concentrates and metals, is to the US.

Furthermore, following the Pentagon briefing in May 2019, it was reported in the media that the US had held discussions with other RoW REE pre-producers, including a number of companies with deposits in Africa and Australia.

Last month, the narrative intensified: China’s top legislature passed a law on export control, allowing the government to ban exports of strategic materials and advanced technology to specific foreign companies, on its equivalent of the US Department of Commerce’s Entity List. Concerns have been raised that REEs may be included in the restricted items.

The new Chinese law goes into effect on 1st December. Consequently, over the past six weeks, there has been a frenzied buying of REEs, most notably the light MREEs, neodymium and praseodymium (‘NdPr’).

v) ***Pricing of MREEs***

Neodymium Oxide price chart over past three years:



Owing to MP Materials bringing the Mountain Pass mine back online in early 2018, the spike in REE price that was witnessed in 2017, rapidly faded away. With the aforementioned potential freeze on Chinese exports of REEs potentially coming into play next week, however, REE prices have rocketed. If indeed REEs are included in the restricted items listed, it is unlikely that REE prices (particularly those of the MREEs) will return to the levels witnessed over the past three years, anytime soon.

vi) ***Investing and M&A activity concerning RoW advanced-stage REE deposits***

As we detailed in our 2017 note, investment by both the Chinese and RoW nations in ex-China REE deposits had begun in earnest in 2016:

- In August 2016, a subsidiary of Chinese coal producer Shandong Taizhong Energy Co. Ltd entered into a \$30m equity funding agreement with Northern Minerals Ltd, owner of the Browns Range heavy rare earths project in Halls Creek, Western Australia.

- In September 2016, Chinese REE specialist Shenghe Resources Holding Ltd ('Shenghe') agreed to subscribe for a 12.5% equity stake in Greenland Minerals and Energy Ltd ('GMEL') for a consideration of \$4.6m. GMEL is the owner of the Kvanefield REE project in southern Greenland.
- In June 2017, Shenghe and two US institutions, JHL Capital Group and QVT Financial, outbid competitors in an auction to acquire the mothballed Mountain Pass mine in California, previously owned by Molycorp before the company went into bankruptcy, for \$20.5m.

Since then, investment in RoW pre-producers has intensified. Below are just a few examples:

- In November 2017, Talaxis, a subsidiary of major Asian commodity trader Noble Group, committed to invest £12m at project level in Mkango Resources' Songwe Hill project in Malawi, for a 49% equity interest.
- In July 2019, Arafura Resources, owner of the Nolans Project in Australia's Northern Territory, raised A\$23.3m in new equity in order to accelerate the development of its NdPr-rich deposit. Talaxis invested A\$4.7m in the fundraise, giving it a 5.23% equity stake in Arafura.
- This year, the Angolan Sovereign Wealth Fund has invested approximately A\$21.5m in Pensana Rare Earths for a 23.1% equity stake. Pensana is close to completing a bankable feasibility study over its Longonjo project in Angola.
- In March 2019, Australian conglomerate Wesfarmers made an A\$1.5 billion all-cash offer for Lynas Corp, owner of the Mt Weld mine in Western Australia. The bid, at A\$2.25 per share, represented a 44.7% premium to the previous day's closing share price. Lynas rejected the offer.

Over the 18 months since then, Lynas' share price has risen to A\$3.69, and its market capitalisation, to A\$3.32bn.

- This month, MP Materials (the company formed by the consortium that bought out the Mountain Pass mine from administration in 2017, for \$20.5m) listed on the NYSE via a SPAC merger, raising \$200m new cash at \$10 per share in the process. At the fundraise price, MP Materials had a market capitalisation of \$1.47bn, with circa \$500m in net cash. Since the commencement of trading, the Company's share price has increased to \$22.29, giving it a market capitalisation of \$3.28bn.

Outlook for the global REE industry

We believe that all the prevailing themes within the global REE industry over the past three years (that we referenced above), will continue for the foreseeable future – and that resultantly, REE prices will continue to appreciate. Market forecasts for growth in global demand for REEs – particularly for NdPr – are extremely bullish and support our view that demand will soon outstrip supply.

For example, sector specialist Adamas Intelligence forecasts that global demand for MREE oxides will increase at a compound annual growth rate (“CAGR”) of 9.7% over the next decade. A similar forecast CAGR for MREE oxide *pricing* will result in the global market for MREE oxides increasing from \$2.98bn this year to \$15.65bn by 2030.⁵

Even after accounting for new supply due to come online this decade, Adamas Intelligence estimates that there will still be a 16,000 tonne NdPr oxide deficit in 2030 – approximately equal to the amount of material needed for the production of circa 20 million EV traction motors.

In short then, we believe that our thesis that we posited in July 2017 is slowly but surely coming to fruition. We expect more of the same over the next three years, and so retain our 2017 thesis, only tweaking the wording to the following:

“The global rare earth elements (‘REE’) industry is undergoing a fundamental shift, as the rest of the world slowly begins to free itself from the shackles of quasi-monopolist China. A number of high quality, ex-China REE projects are now being rapidly developed, but are all still at least two years away from production. Consequently, with China curbing its exports and overall domestic production, and with the global rollout of renewable energy technologies that utilise REEs rapidly accelerating, we believe that a structural deficit in the global market approaches. Prices of the magnet REEs, especially NdPr, are thus likely to form a materially higher price base over the next three years. This will in itself facilitate the bringing online of the aforementioned ex-China deposits. As such, we retain our view that late-stage REE projects that possess mineralisation with a high NdPr ratio, and that have a visible path to production, will become highly sought after by investors going forward.”

⁵ adamasintel.com/rare-earth-magnet-market-outlook-to-2030/

Disclosure

The author of this paper, Myles McNulty, is a private investor.

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