

# Permanent Magnet Usage to Bolster Lynas

We're no strangers to Tesla's announcements making waves in resource markets, but the most recent decision to use permanent magnet based motors in the new Model 3 RWD in order to increase performance and reduce costs benefits one organisation in particular; not only are neodymium (Nd) and praseodymium (Pr) the highest value products coming out of Lynas Corporation (ASX: LYC | OTC: LYSDY) ("Lynas"), but this year the company became the top global producer of these rare-earth elements outside of China, and as such, are perfectly positioned to take advantage of increasing prices throughout 2017.

Powertrain motors featuring permanent magnets provide numerous benefits: lower weight, higher torque density and improved efficiency when compared to induction motors, making them perfect for hybrid electric (HEV) and full electric vehicles (EV). This means they provide faster acceleration, reduced vehicle weight and additional space for other components. It is therefore conceivable that NdPr motors will become the dominant EV technology in years to come.

Some EV models do already use permanent magnets in either the traction motor or generator, including the Chevrolet Bolt, but it is expected that a much higher proportion of future models will incorporate permanent magnet motors as the market becomes more competitive. Sales of HEV/EVs totaled 3.2 million units in 2016, with HEVs and plug-in HEVs forming 76% of sales. By 2020, sales of HEV/EVs are forecast to reach 9.4 million units, with EVs forming 42% of sales. These forecasts are bolstered by the fact that France and the UK recently declared that they will both ban the sale of petrol and diesel vehicles by 2040, and Volvo claiming that they will manufacture only electric vehicles from 2019.

Following from the climbing popularity of permanent magnet motors, demand for rare earth elements used in their manufacture is forecast to increase by 10.5% annually through to 2020. Nd/Pr types form the vast majority of rare earth permanent magnets, and have seen prices increase significantly in 2017 as a result of continuing closures of mining operations in China. China have stuck closely to their commitment to gaining control over the sizeable industrial complex, resulting in large scale shutdowns of illicit operations across the entire country.

China once produced almost 100% of the world's rare earths, but a more recent estimate puts this figure closer to 80%. This has been the black swan for which Lynas were waiting so long; the company consistently stated that their biggest challenge was protracted poor market conditions, which miraculously evaporated throughout this year. Having the highest grade rare-earth mine in the world will only get you so far; if the right market conditions are absent for whatever reason, the product sells at a loss and the 25 year mine life collapses into a year or two.

However, prices are going up, and Lynas have recently completed a second mining campaign at their Mt Weld site, increasing available ore by another 240,000 tonnes at a grade of 17.6% rare-earth oxide. The performance of company stocks so far this year may have been impressive, but the near-perfect conditions that have materialised in 2017 lead me to believe that Lynas will be enjoying expanding margins for many years to come. The rare earth buy window is far from closed, and, for me at least, Lynas are the producer-of-choice for investors looking for exposure.