

What are Rare Earths?

— 02 —

Rare earths are not, in fact, rare. They are common in the earth's crust but hard to find in economic quantities and even more complex to extract. One of the world's largest and best defined rare earth deposits is the cornerstone of Arafura's Nolans Project in the Northern Territory.

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Until recently, rare earths were mostly mined, processed and refined in China. However, rare earths are needed across the world because of our dependence on technology and pursuit of clean energy solutions. China, Japan and the USA account for most of the world's demand for rare earths.

Rare earths are key elements used in the automotive, consumer electronics, green energy, aerospace and healthcare sectors, and in oil refining.

The fastest growing and highest value market for rare earths is in rare earth permanent magnets. These magnets are three times stronger than, and a tenth the size of, conventional magnets. They are one of the reasons why everyday items have become smaller, lighter, mobile, more efficient and more affordable.

NOLANS RARE EARTHS

Arafura Resources is one of only a handful of companies outside China moving towards production. The company expects to be a major producer of rare earths from its Nolans Project within the next few years.

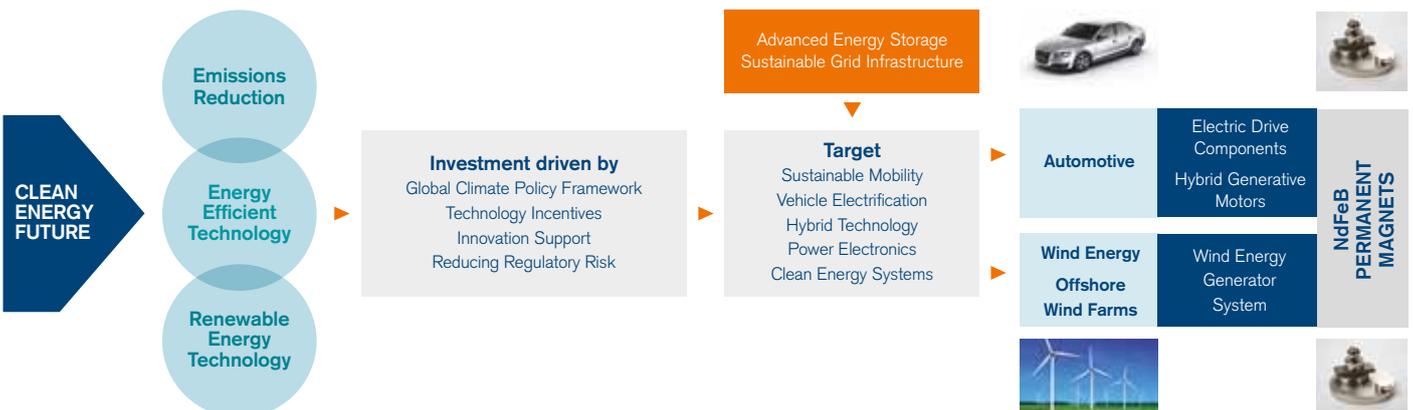
The Nolans Project contains all fifteen rare earths but is particularly enriched in the 'magnet feed' rare earths: Neodymium (Nd) and Praseodymium (Pr). These rare earths will likely account for about 80 per cent of the revenue from Nolans.

As the demand grows for NdPr and other critical rare earths, end users of rare earths in Europe, South Korea, the USA and Japan are seeking alternative supply sources. Arafura is working towards finalising long-term sales agreements with customers that want certainty of supply from Nolans.

So how does a lump of ordinary-looking Central Australian rock end up as a fine powder that puts the yellow in ceramics, the super strength in magnets and the colour in smart phone screens?

First, the rock is mined and crushed and the silica and clay minerals are rejected. A concentrate slurry is then pumped to a chemical plant for the next stages of processing that involve dewatering, acid leaching, baking, filtering, washing and removing impurities. These processes are used to recover and separate out five final rare earth products to a purity that meets very tight customer specifications.

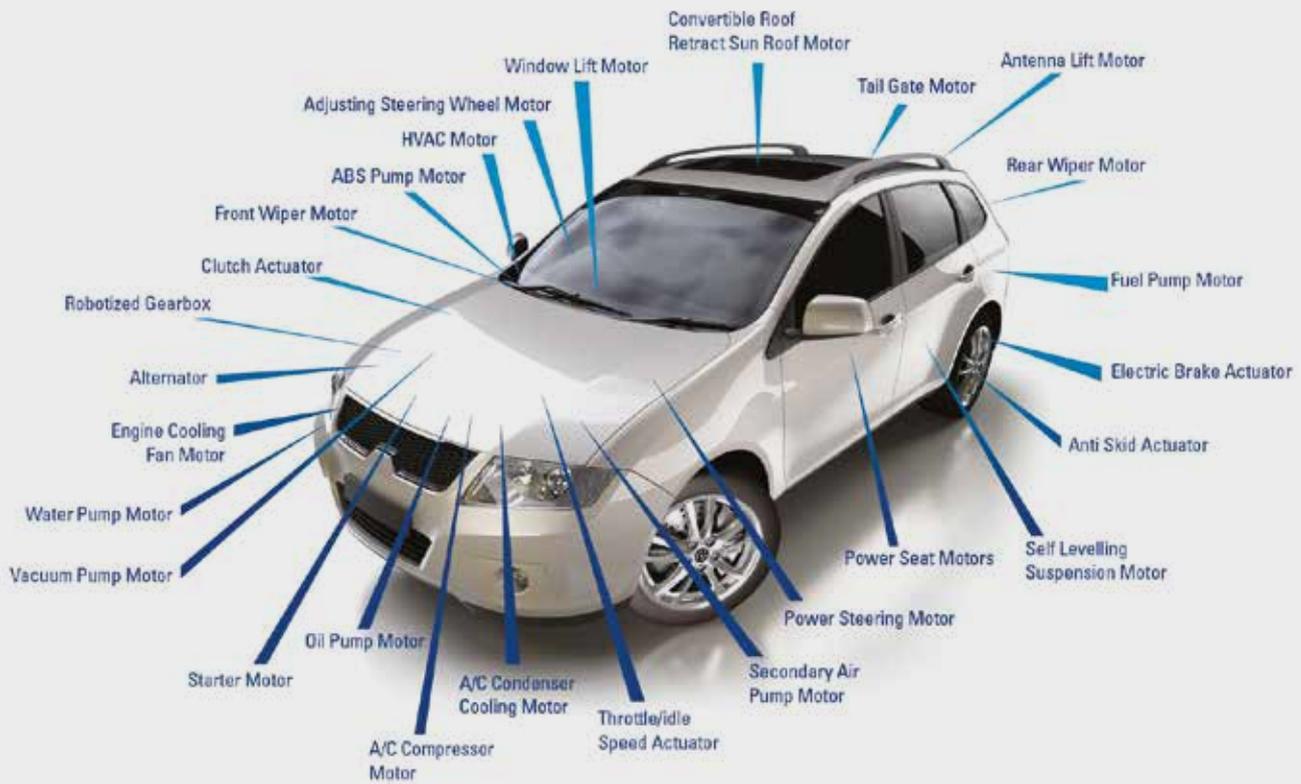
This is the very simple version. If you're technically inclined, see the Nolans Development Report on our website at www.arultd.com



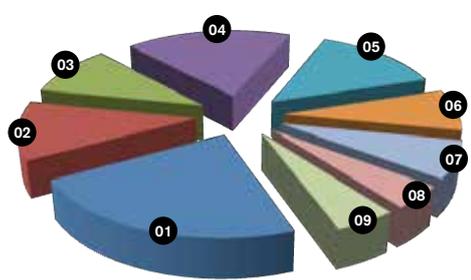
Rare earth magnets are vital to a clean energy future



Rare earths are an essential part of today's lifestyle and the modern economy. To learn more, visit www.rareearthtechalliance.com



Magnet-driven electric motors are now common in cars



- 01 Magnets - 23%
- 04 Catalysts - 18%
- 07 Phosphors - 7%
- 02 Metal Alloys - 11%
- 05 Polishing - 14%
- 08 Ceramics - 4%
- 03 Batteries - 10%
- 06 Glass - 8%
- 09 Other - 5%

Nolans is enriched in NdPr rare earths, the building blocks of permanent magnets

Rare earth market applications (2013)



1. La Oxide
2. Ce Oxide
3. NdPr Oxide
4. SEG Oxide
5. HRE Oxide

Arafura rare earth product samples

The Nolans Project contains all fifteen rare earths but is particularly enriched in the 'magnet feed' rare earths: Neodymium (Nd) and Praseodymium (Pr). These are critical for high performance magnets used by the automotive sector and in wind turbines, and will likely account for about 80 per cent of the revenue from Nolans.