

WHAT ARE RARE EARTHS?



Rare earths are not rare

While the 15 rare earth elements occur commonly in the earth's crust, they are difficult to find in economic quantities and even more complex to extract.

One of the world's largest known and best defined rare earth deposits is the cornerstone of Arafura's Nolans Project, 135 kilometers north of Alice Springs in Australia's Northern Territory. The Nolans deposit is particularly enriched in the rare earths Neodymium and Praesodymium (NdPr together).

The majority of the world's mining, processing and refinement has traditionally taken place in China.

Today, rare earths demand is increasing rapidly across the world, as demand for technology and clean energy solutions soars.



Rare earth permanent magnets are vital to a clean energy future

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

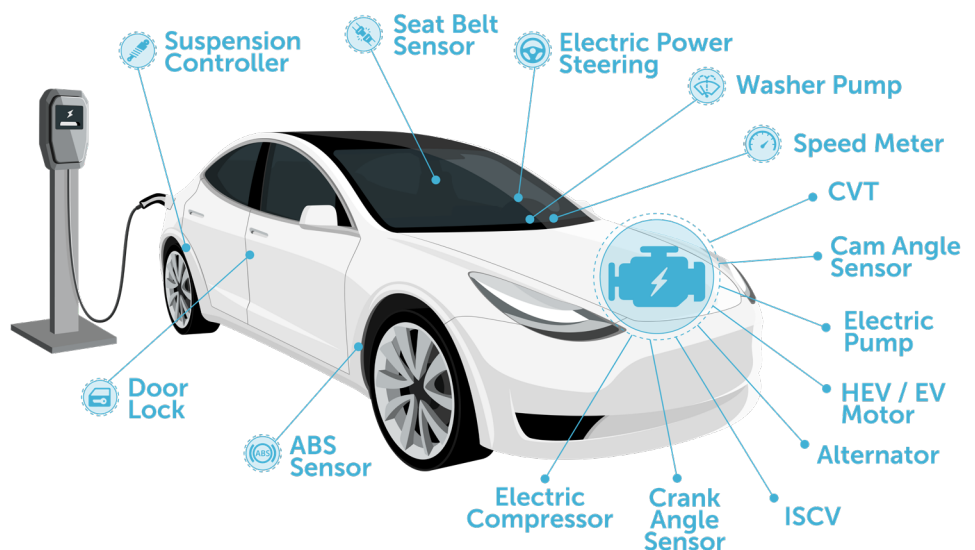
The fastest growing and highest value market for rare earths is the production of rare earth permanent magnets. These magnets are three times stronger and one-tenth the size of conventional magnets.



Rare earth permanent magnet technology is a major contributor to everyday items becoming more efficient, more affordable, smaller, lighter and mobile.



Rare earth permanent magnets are a critical component of most of the world's electric vehicle technology



Nolans Rare Earth Project

Arafura Rare Earths is developing the Nolans Project - the world's only single site ore-to-oxide rare earths project outside China.

While the Nolans resource contains all 15 rare earths, it is particularly enriched in the magnet feed rare earths NdPr.

As the demand grows for NdPr and other critical rare earths, end users in Europe, South Korea, the USA and Japan are seeking alternative supply sources. Arafura has signed binding offtake agreements with Hyundai and Kia, Siemens Gamesa Renewable Energy and Traxys. Advanced offtake negotiations are continuing with a number of major global organisations seeking 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 super strength in magnets that help drive an electric vehicle or turn the blades of a wind turbine?’

First, the rock is mined and placed on stockpile. The ore is then trucked to the process plant 8km south of the mine where it is crushed and milled (ground) and unwanted minerals are rejected. The resulting concentrate is then pumped to an adjacent plant for the next stages of processing that involve acid leaching (dissolving), baking, filtering, washing, removing impurities and refining. These processes are used to recover and separate out final rare earth products to a purity that meets stringent customer specifications.

Rare earths are an essential part of today's lifestyle and the modern economy



WIND
TURBINES



ELECTRIC
VEHICLES



ROBOTS



MRI
MACHINES



PHONES &
TABLETS

The Nolans Project is particularly enriched in the
'magnet feed' rare earths:

NEODYMIUM (Nd)
PRASEODYMIUM (Pr)

These are critical for high performance rare earth permanent magnets primarily used by the automotive sector and in wind turbines.

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