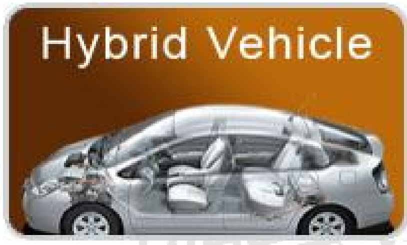
What are Rare Earths?

What do they do?

Application 1: **Enhancing environmental protection**



Reduce Greenhouse Gas Emissions
Global warming due to green house gas emissions is a concern for us all. Rare Earths already play a vital role in the reduction of green house gas emissions.

Many scientists believe that global warming is caused by a human-driven increase in greenhouse gases in the earth's atmosphere. Our society is becoming more aware of the part we have to play in addressing global warming. Governments of today are now legislating higher environmental and lower emission standards in both domestic and industrial settings.

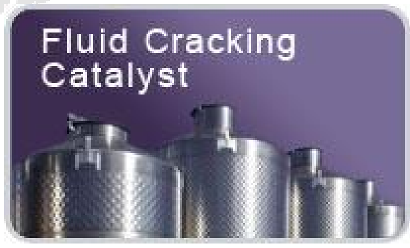
Rare Earths are playing a pivotal role in greenhouse gas reduction through their unique application in automotive catalytic converters, hybrid vehicles, wind turbines, and energy efficient compact fluorescent light bulbs.

Application 2: **Enabling Digital Technology**

The digital era is gathering pace; broadband access, digital television, digital cameras, and digital music are around us at home and on the move – Rare Earths are enablers of this technology and its miniaturisation.

New materials and novel applications of them enable companies to produce more efficient, higher performance materials which meet the demand for faster, smaller and lighter products.

Application 3: **Improving Energy Efficiency**



Increased population and economic growth leads to greater demand of the world's energy, which means increased use of our limited fossil fuel reserves. Rare Earths are already playing a vital role in conservation of these reserves, and are likely to play an even larger role in taking us forward to the hydrogen economy.

The world's fossil fuels are limited, however with the billions of dollars invested in the global oil and gas infrastructure it is important we use these reserves efficiently.

Rare Earths are supporting the uptake of energy efficient initiatives through their unique physical and chemical properties, which allow them to; protect the environment by lowering energy consumption; and improve lifestyles through energy efficient alternatives that save money without sacrificing comfort and reliability.

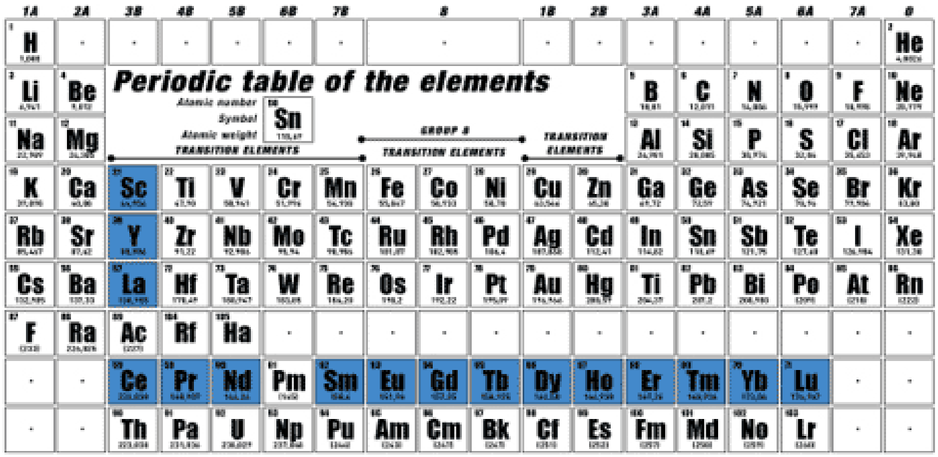
Where do they come from?

Rare Earths are not found as free metals in the earth's crust, rather within a mixed 'cocktail' of Rare Earth elements that need to be separated for their individual or combined commercial use. Despite their name, Rare Earths are relatively abundant in the earths crust, however are often of low quality and rarely presented in economic concentration.

China currently supplies approximately 95% of the global Rare Earths market. More than 70% of the supply of light Rare Earths are supplied from one mine in China. Mt Weld, with its very high grade contains light Rare Earths and is also high in Europium, a heavy Rare Earth.

What are they?

Rare Earths are a moderately abundant group of 15 metallic elements known as the Lanthanide series (atomic numbers 57 through to 71) plus Yttrium (39). Although Scandium (atomic number 21) is not a Rare Earth element, it is commonly included with the Lanthanides because of its similar properties. The 15 lanthanides are represented by the single square of lanthanum in the main part of the periodic table and listed in a separate sub group below the main groupings.



They range in crustal abundance from cerium, the most abundant, at 60 parts per million, which is in fact more abundant than nickel or copper, to thulium and lutetium, the least abundant Rare Earth element at about 0.5 parts per million