

# Rare earth metals: Another challenge for the green economy?

April 3 2012, By Iliana Cardenes Trujillo

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Valuable Rare Earth Metals posing a challenge to clean technologies

If you follow the clean energy dialogue, then you may have encountered discussions about the role of rare earth metals at some point in the last year or two. If not, read on, because rare earths should not be a rare topic to you.

Rare earth metals, such as yttrium, [lanthanum](#) or [cerium](#) are formed from 17 chemically similar elements and are not often found in large enough concentrations to be profitable. They are, however, used in the manufacture of a wide range of technologies, from batteries to smartphones to military equipment. Because of their strong [magnetic properties](#) and high electrical conductivity, they are light in weight and efficient, making them critical to the clean energy industry. [Wind](#)

[turbines](#), energy-efficient light bulbs, electric [car batteries](#), and efficiency motors/generators all depend on dysprosium, neodymium and their other cousins to generate the magnets that make them work. So far no substitute has been found that can match [rare earths](#) in weight and efficiency.

Historically, their rarity has not posed a problem, as there has been adequate supply to meet [global demand](#). But questions are being raised about the future of the supply. China mines 94 to 97% of the rare earth metals globally, and while there have been increasing efforts in the US and Europe to find alternative supplies, the complex and highly polluting extraction process is proving problematic. China's global monopoly is an increasing worry: their halt of rare earth exports to Japan in 2010 led to a 30-fold increase in the price of rare earth metals by the summer of 2011; with a subsequent plummeting of up to three fifths from that price, indicating the current volatility.

Two weeks ago, the US, EU and Japan filed a formal request for consultation with the WTO about China's increasing restrictions on the exports of their rare earth metals. There will be a legal case in May 2012 if China does not agree to the demands.

This constraint on supply is worrying for climate change because if clean technologies are to contribute significantly to the reduction of greenhouse gas emissions, then the supply of [rare earth metals](#) needs to increase with the growth in the sector. Randolph Kirchain, Elisa Alonso and Frank Field, of MIT, [recently explained](#) in *Environmental Science and Technology* that in order for clean technologies to contribute significantly to reducing greenhouse gases, we would require an increase of neodymium and dysprosium of over 700% and 2600% respectively in the next 25 years. The supply of these metals is currently increasing at 6% a year, and is under threat. In order to meet demand for clean technologies, the supply would have to increase by 8% and 14%.

Geologists, scientists, planners, governments and anyone playing a role in the clean technology market needs to start thinking about how these materials can be used more efficiently, finding new sources, and ultimately reducing reliance. If not, we are could lose out on the opportunities provided by alternative energy sources. If you haven't yet, add the rare earth metal topic to your list of significant concerns to look out for in the years to come.

Source: Columbia University

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