



Mount Weld © Lynas



# Invest in the West

## Rare Earth Elements & Lithium in Western Australia

Western Australia continues to lead the way as Australia's premier resources investment destination.

Western Australia attracted 52 per cent of total national spending by the industry in Australia valued at \$90 billion in 2013-14.

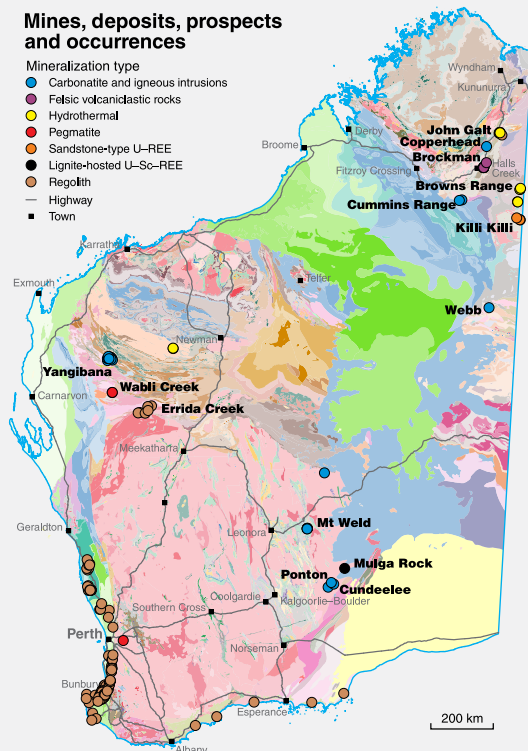
Fuelled by strong demand for resource commodities from Asia, new capital expenditure by the State's mining industry has grown at an annual rate of 15 per cent during the five years to 2013-14.

Rare earths and lithium are critical to the world's green energy future and applications in high tech industries and defence. In Australia, new rare earth deposits are estimated around 6 per cent of the world's deposits. There are a number of major rare earth and lithium operations in various stages of commission and production.

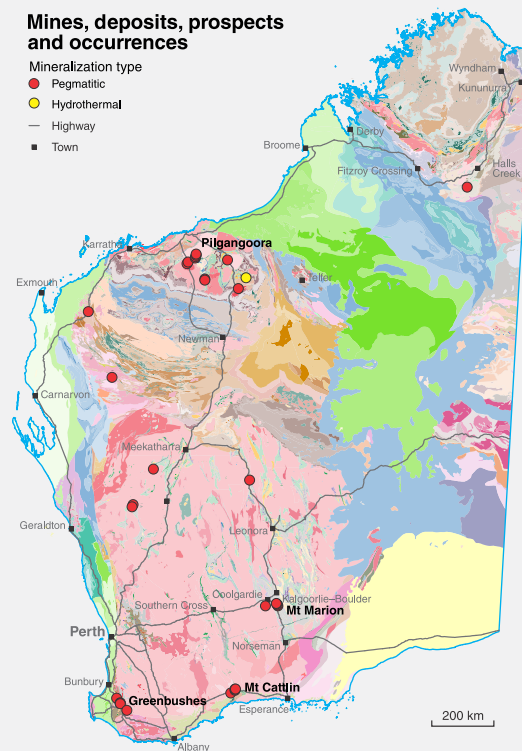
### RARE EARTH AND LITHIUM FAST FACTS

- Australia's Rare Earth Oxide resources totalled 3.19 million tonnes (Mt) of Economic Demonstrated Resources (EDR) in 2013 with a further 23.24Mt Inferred Resources.
- The majority of the world's identified rare earth deposits are light rare earths, while demand exceeds supply for the heavy rare earths. Western Australia does have a number of highly prospective light and heavy rare earths projects under evaluation.
- Australia has well-developed technology and research capability through to the processing stages of mixing oxides.
- Australia's Lithium EDR were estimated to be 1538 kilotonnes (kt) in 2013 with a further Inferred Resource of 139 kt.
- All deposits occur within hard rock pegmatite deposits.
- The bulk of Australia's lithium resources are in the Greenbushes' spodumene deposit and the Mount Marion spodumene deposit in Western Australia.

# Maps of Rare Earth Elements and Lithium in Western Australia



*Rare Earths, Department of Mines and Petroleum May 2014*



*Lithium, Department of Mines and Petroleum March 2015*

## Rare Earth Producer

### Lynas Corporation Ltd

Operates the Mount Weld mine and concentration plant in Western Australia, as well as an advanced materials plant in Malaysia. The majority of the rare earths refined in Malaysia is supplied to the Japan market. Neodymium and praseodymium represent about 90 per cent of the sales revenue.

## Rare Earth Explorers

Western Australia is prospective for rare earths in a variety of geological settings, but the most advanced exploration projects are Browns Range (Northern Minerals Ltd) and Yangibana (Hastings Rare Metals Ltd).

### Alkane Resources

The Dubbo Zirconia Project (in NSW) of LREE, HREE, zirconium and niobium deposit is projected to start commercial production in 2016–17.

### Arafura Resources

The Nolans Rare Earths Project (in NT) is in advanced feasibility. Construction is targeted to commence in 2016–17, with first production expected in 2019.

### Hastings Rare Metals Ltd

Hastings Rare Metals has two advanced exploration projects — Hastings (in the east Kimberley) and Yangibana (in the Gascoyne). The company has started a pre-feasibility study at Yangibana with plans to commence production in 2018.

### Northern Minerals Ltd

Advancing the Browns Range project in the remote Tanami region that contains a very high proportion (87 per cent) of heavy rare earth elements, particularly dysprosium. Construction is targeted for 2016 followed by production in 2017. Two on-site processing facilities are proposed — a beneficiation plant and a hydrometallurgical plant.

## Lithium Producers

### Galaxy Resources Ltd

Galaxy Resources Ltd operated the Mount Cattlin spodumene–tantalite–mica mine near Ravensthorpe until it was placed on 'care and maintenance' in 2012. In early 2015, General Mining Corporation Ltd announced its intention to acquire the asset.

### Talison Lithium Ltd (Chengdu Tianqi Group)

Talison's Greenbushes project has been in operation for over 25 years, producing spodumene concentrate. It currently exports over 400,000 tonnes of lithium-rich spodumene concentrates annually.

## Lithium Explorers

### Altura Mining

Altura's Pilgangoora Lithium project has confirmed a JORC (2004) Mineral Resource estimate of 25.2 Mt at 1.23 per cent  $\text{Li}_2\text{O}$ , ranking alongside the best international hard rock lithium deposits, with the added advantage of ease of accessibility to infrastructure and port facilities.

### Cobre Montana NL

Cobre has strategic alliances with Pilbara Minerals Limited, Focus Minerals Limited and Tungsten Mining NL, to investigate lithium and rare earth metals in prospective locations of WA close to well-developed infrastructure. Cobre also has lithium assets near Ravensthorpe.

### Neometals Ltd

Mt Marion is owned and developed by Neometals and Mineral Resources. The project is fully permitted and funded and will commence production once offtake agreements have been put in place. The resource stands at 14.8Mt at 1.3 per cent  $\text{Li}_2\text{O}$  as at 2015 and is open.

### Pilbara Minerals Ltd

In the Pilbara Craton, Pilbara Minerals Ltd is drilling the Pilgangoora lithium–tantalum project, which was previously mined by Global Advanced Metals Ltd until 2012.

## Australian Capabilities

As rare earths are commonly found in close proximity to radioactive minerals, Australia's expertise in managing such materials is available to foreign firms entering this market.

**CSIRO** (Commonwealth Scientific & Industrial Research Organisation) has expertise in exploration, process chemistry and design, and the design of magnet alloys and high efficiency rare earth motors.

**ANSTO** (Australian Nuclear Science & Technology Organisation) provides process development consultancy services for treating ores containing rare earths. Its services range from mineralogical analysis of drill core, process development studies at laboratory scale and pilot plant demonstrations. The rare earths pilot plant facilities at Lucas Heights are recognised as leading edge and are accessed by companies from all over the world.

## Western Australian Capabilities

Perth is a centre for scientific and technological innovation, in response to the needs of Western Australia's global scale energy and resources sector. Major research institutes in the State include:

- Centre for Exploration Targeting (CET)
- Curtin Business School, Energy and Mineral Economics
- Geological Survey of Western Australia
- Minerals Research Institute of Western Australia (MRIWA)
- Murdoch University, School of Engineering and Information Technology
- National Resource Sciences Precinct (NRSP)
- University of Western Australia's Australian Centre for Geomechanics

## Investment Attraction Requirements

Under certain circumstances foreign companies wishing to invest in, or acquire, Australian mining projects are required to notify the Foreign Investment Review Board (FIRB). In respect of investing in existing exploration projects or undertaking their own exploration in Australia, foreign companies are not required to seek approval under foreign investment policy.

Western Australia treats exploration and processing of all minerals equitably, only varying royalty rates and licensing fees to some degree. The Department of Mines and Petroleum (DMP) is the designated lead agency for the administration and regulation of the resources sector and the Department of State Development (DSD) is the lead agency for State significant projects.

## Western Australia's Commercial Environment

Western Australia hosts:

- The shortest travel times from an Australian State capital to most Asian and Indian Ocean markets
- A shared time zone with much of Asia
- Longstanding business links with China, India, Japan, Korea and South East Asia
- A transparent regulatory framework and simplified investment procedures
- Historic supplier of mineral and energy products.

More than a third (722) of all Australian Stock Exchange-listed companies are based in Perth, with 80 per cent of Western Australian based listings in the materials and energy sectors.



## A Dynamic Lifestyle and Location

With liveability rankings consistently in the Economist Intelligence Unit's (EIU) top ten, Perth offers a relaxed, friendly and outdoor lifestyle with modern infrastructure, health and education facilities and leisure and cultural activities. Similar to other major Australian cities, Perth also has a big multicultural population.

Western Australia covers an area of 2.5 million square kilometres (3.5 times the size of Texas), and has a pristine coastline stretching 12,500 km. Perth's Mediterranean-style climate averages 8 hours of sunshine a day.

Western Australia's attributes offer investors distinct advantages. It has Australia's highest rate of skilled migration and one of the lowest unemployment rates in the world.

Perth is one of the world's largest and most distinctive resource hubs and is increasingly the regional headquarters for resources and resource services companies.



Information current as at February 2015

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