



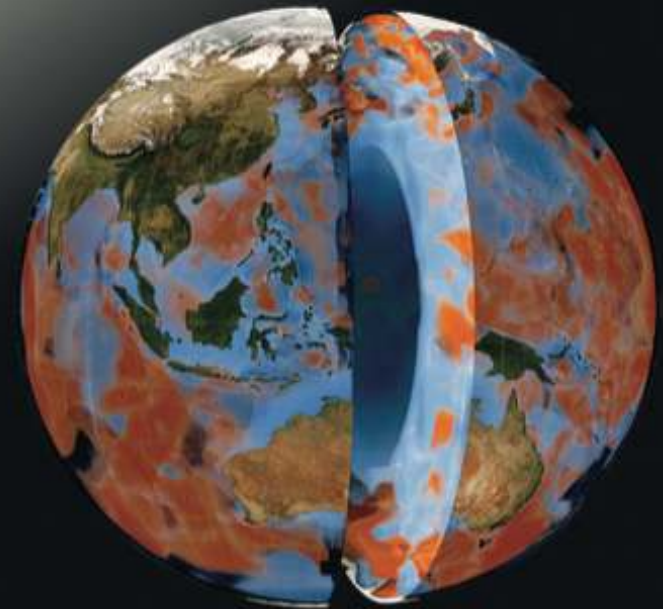
The Australian Earth Observatory

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University of Melbourne

Building the Australian Earth Observatory
Hyatt Canberra
Tuesday 30 July 2013

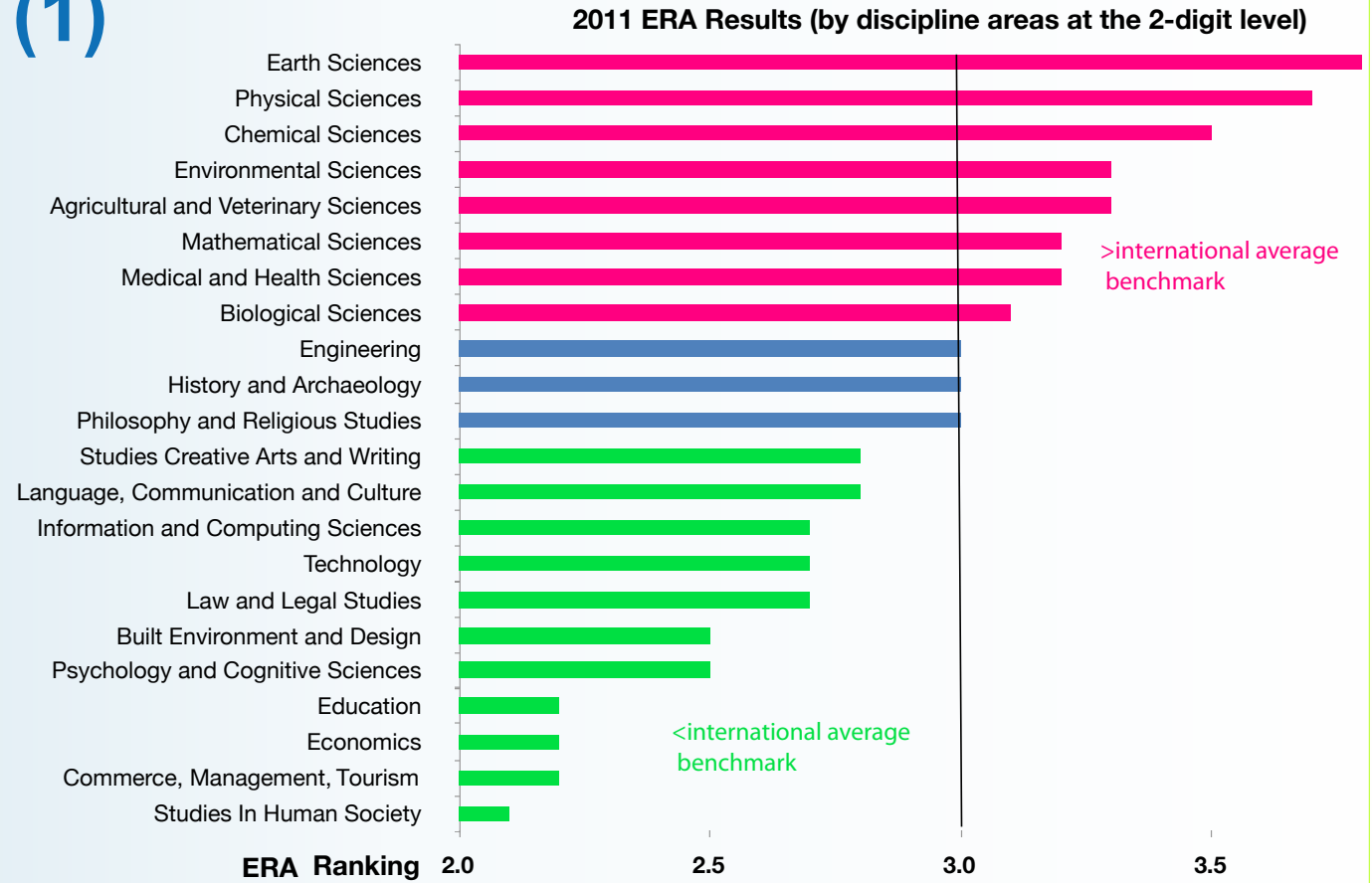


The Australian
Earth Observatory –
infrastructure roadmap

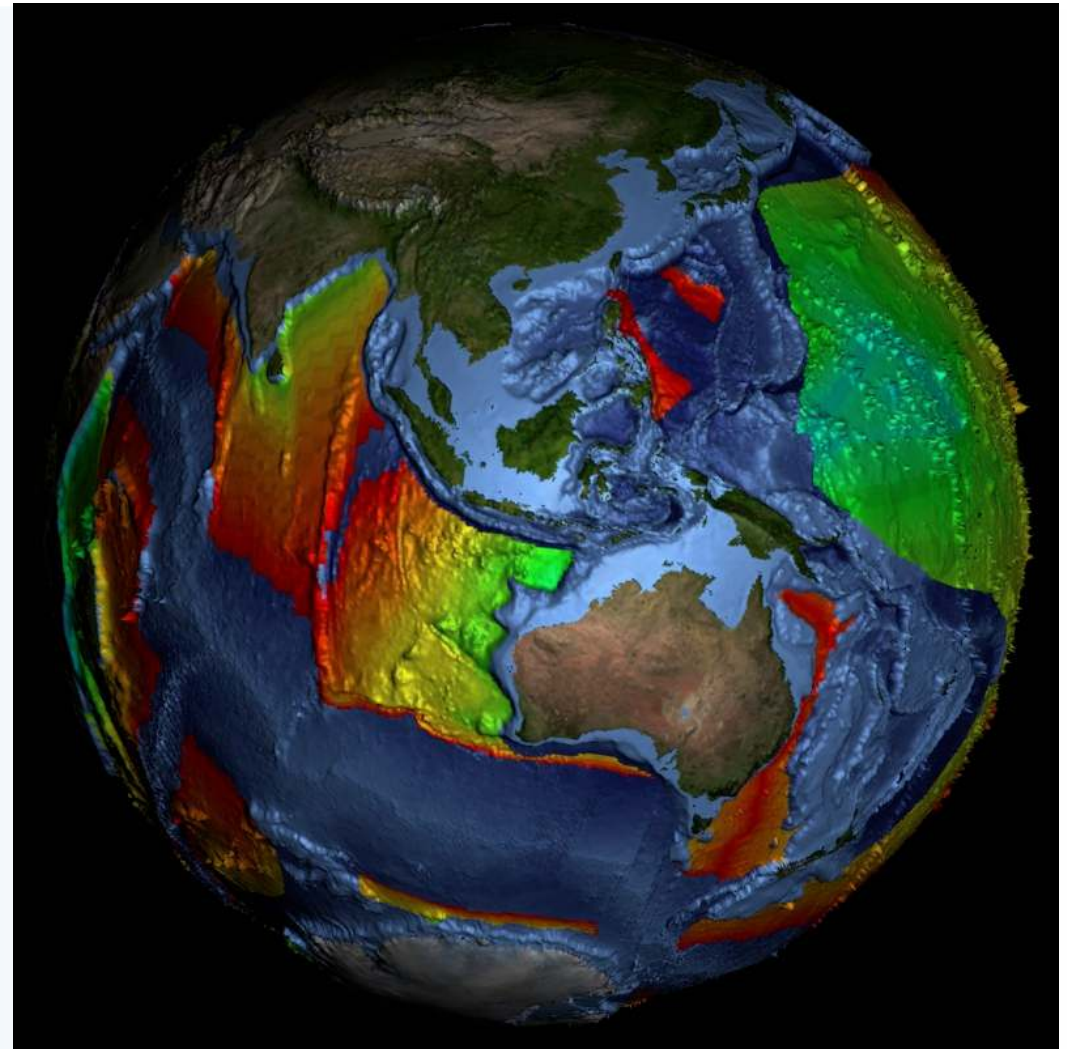


The challenge (1)

- **Enhancing Australian geoscience international research preeminence**



Our unique continent



The challenge (2)

- **Enhancing industry productivity through innovation**



Demand for the rare earth elements is rising particularly, but not only, because of demand for new energy solutions.



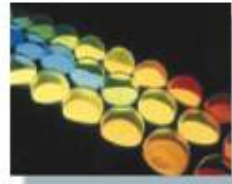
Lanthanum

NiMH batteries
Petroleum refining
Glass
Cast iron additives
Alloys



Cerium

Catalysts
Polishing Glass
Carbon arc
Pigment



Gadolinium

Microwave applications
Phosphors
MRI imaging
Neutron absorbers



Neodymium

Magnets
Glass colouring
Enamel colouring
Lasers
Catalysis



Terbium

Phosphors
Magnets
Fuel cells



Samarium

Magnets
Carbon-arc lighting



Europium

Phosphors



Dysprosium

Magnets



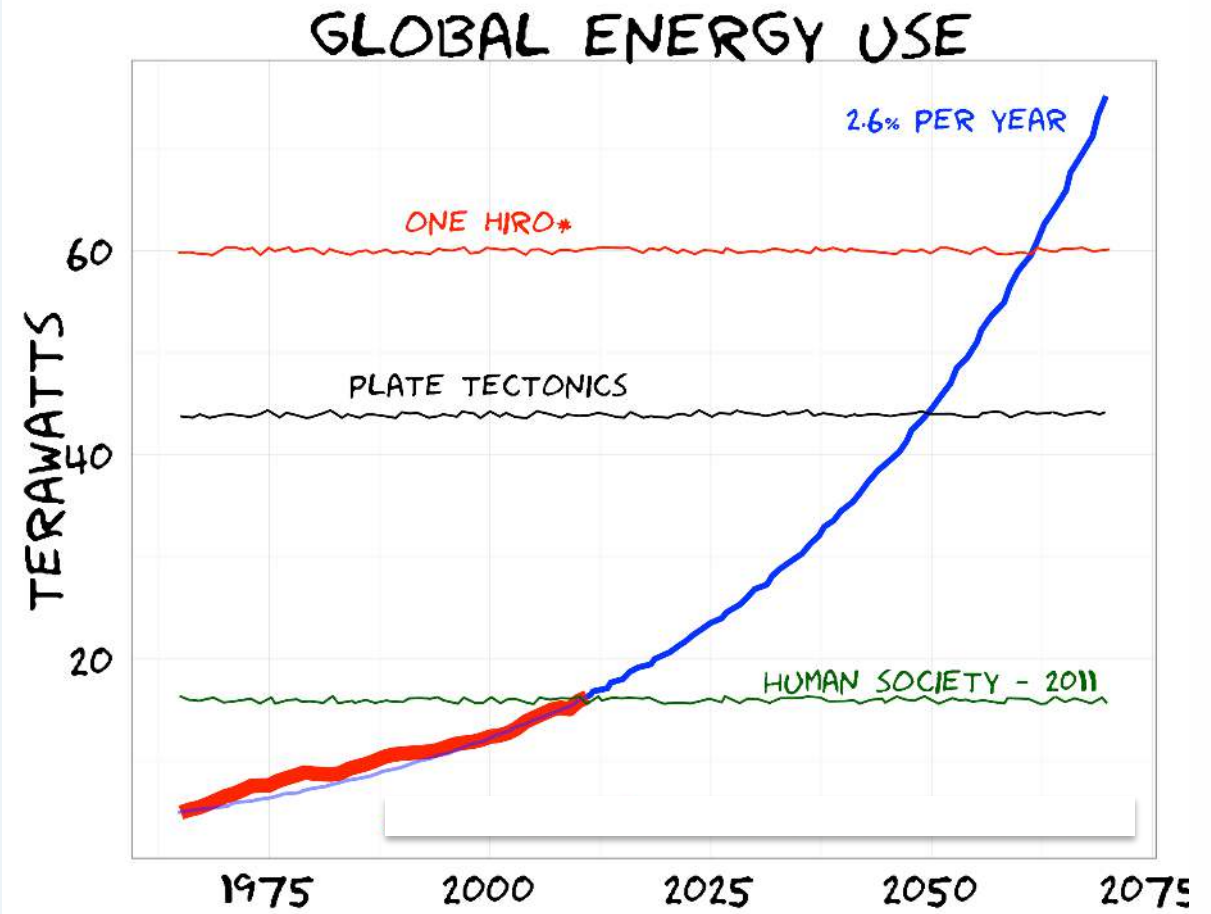
Praseodymium

Magnets
Glass colouring

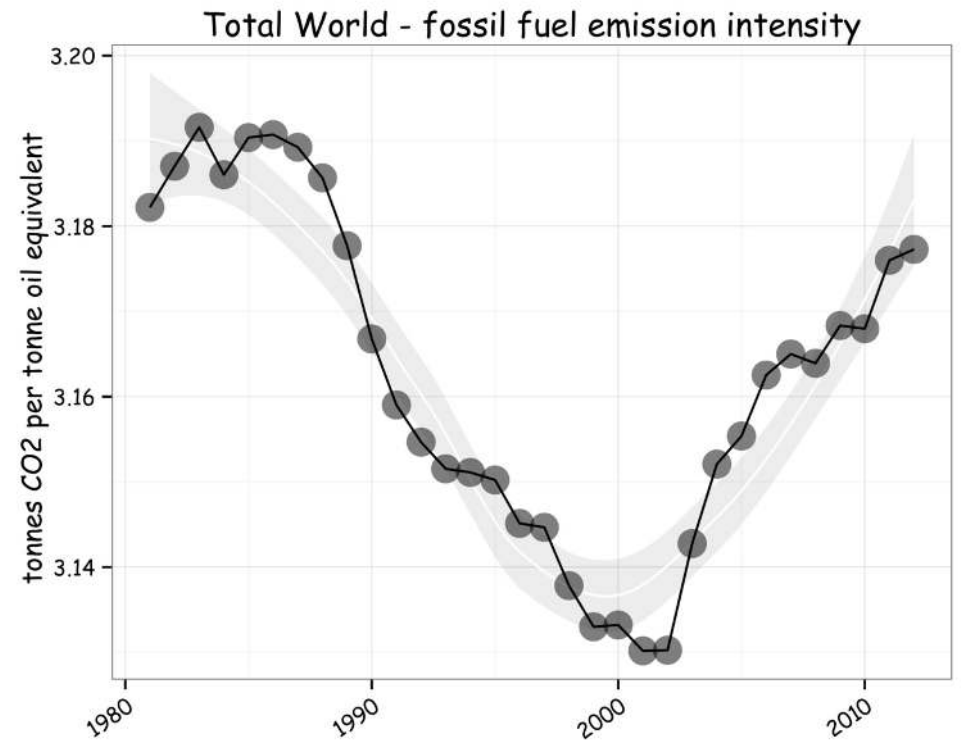
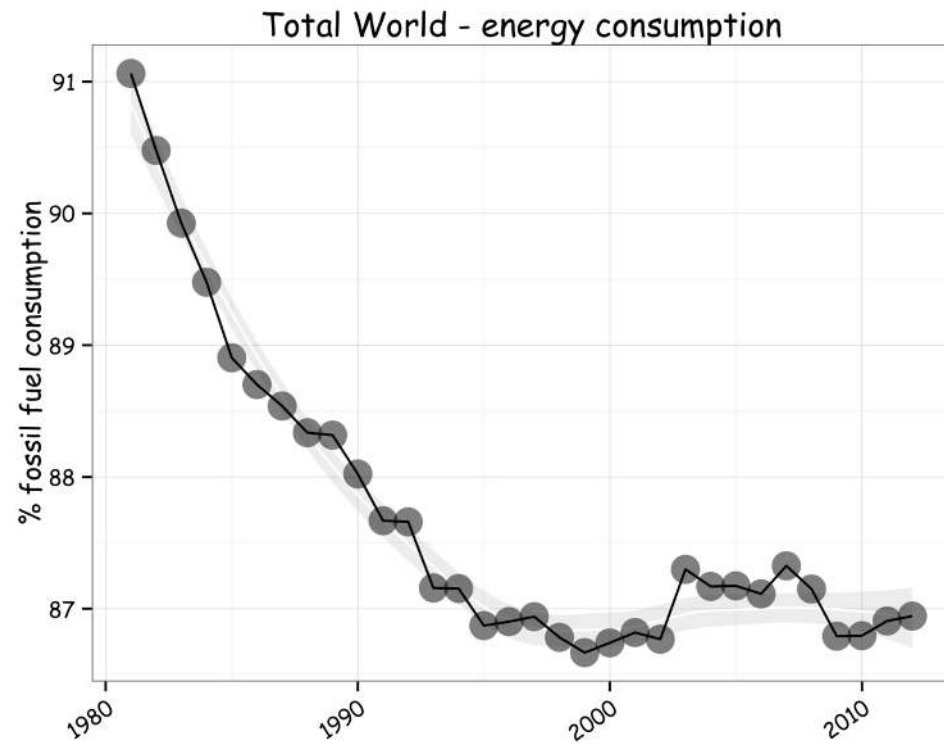
Source Minor Metals and Rare Earths Arafura Presentation, in Lanthanide Resources and Alternatives, Oakdene Hollins Research and Consulting, March 2010.

The challenge (3)

- Informing societal challenges



The challenge (3)



Geo-histories

- Research capability that helps us to unravel the geologic evolution and climatic history of the Australian plate

Geo-present

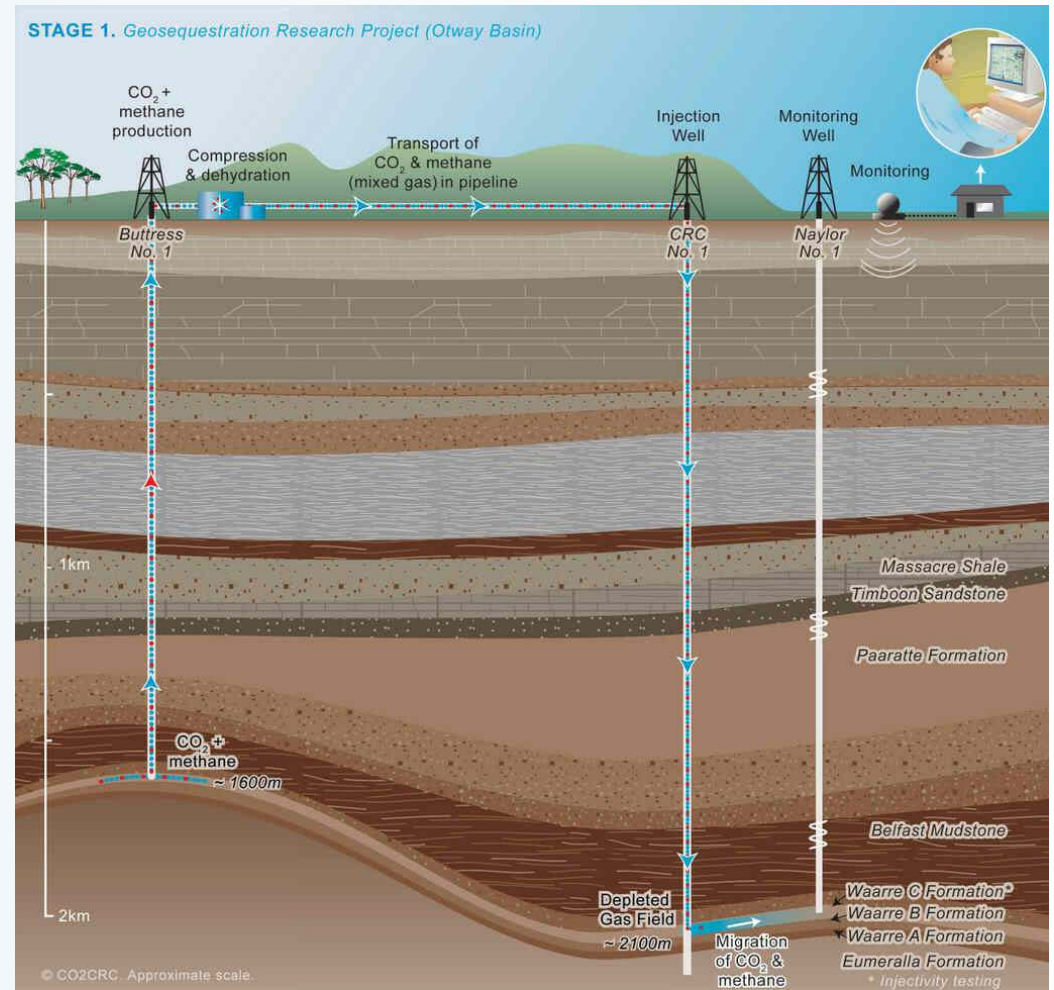
- Research capability that describes the continent today and seeks to describe the impact of and on human activity today

Geo-futures

- Research capability that seeks to probe the continent and look at future options around climate change, renewable energy, water, minerals, natural hazards, etc.

Geofutures

- Predicting future geological responses



Key science questions

- How did the continents grow?
- What are the links between deep Earth processes and evolution of the atmosphere and life?
- How is the Australian continent deforming?
- What are the fluxes of energy and mass between the solid and fluid Earth?
- What are the effects of climate change on sea-level, weathering rates and soil-loss?
-

The Earth Science Observatory- Opportunities

- The Australian Synchrotron
- National sub-surface research facilities
- Participation in very large geo-engineering projects
- Establishment of E-infrastructure research networks

The Earth Science Observatory

- Composition and Evolution Strand
 - A dedicated Earth science synchrotron beam line facility.
- e-Earth Infrastructure Strand
- Geoimaging Strand
- Geospatial Strand
- Materials, Properties and Paragenesis Strand
- Simulation, Analysis and Modelling Strand
- Subsurface Observatory Strand
 - National sub-surface research facility (e.g. Otway site)

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