Exploring Exploration Futures – Insights into possible drivers

Laurie Hutton & Jen Thompson

Strategic foresight

Importance of seeing what is going on around us!

Cannot abandon current products – they are still the basis of our future

However new commodities are also needed to fuel the future technology boom – new opportunities.

Strategic foresight…

Of the top 20 ASX listed projects at development stage 40% are for graphite, Li, Ta, Nb and REE (Argonaut).

Critical technologies for the next ten years are here now

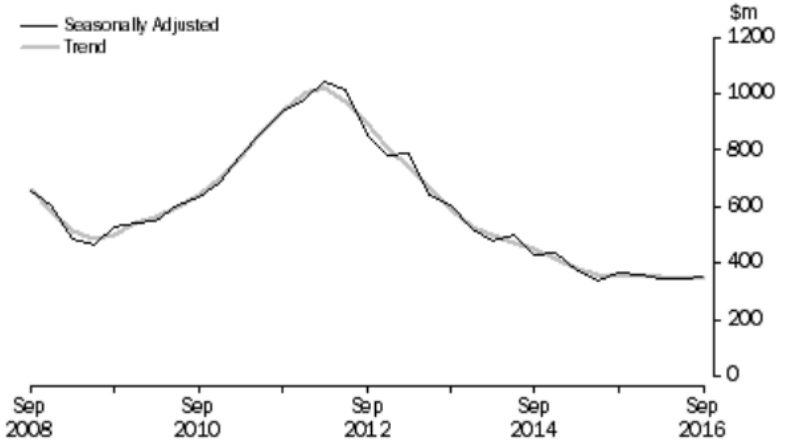
Strategic foresight… take home message

Benefits to be had by looking at future trends and shifts

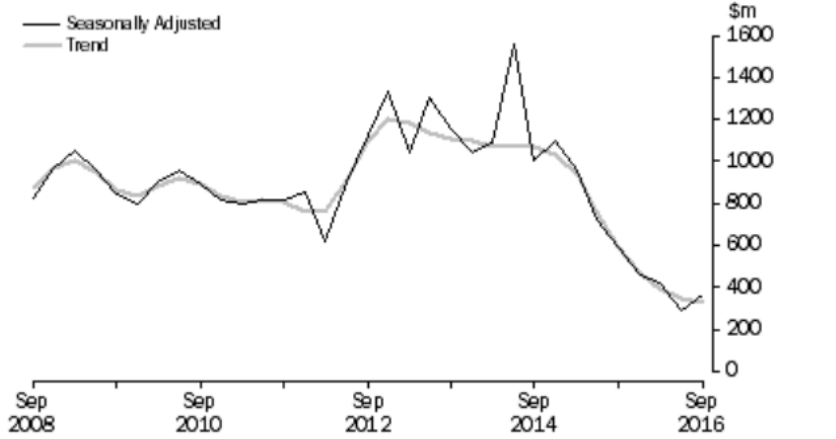
Community attitudes will drive some of these opportunities

Mineral/petroleum exploration in Australia has had a rocky couple of years (pardon the pun?)

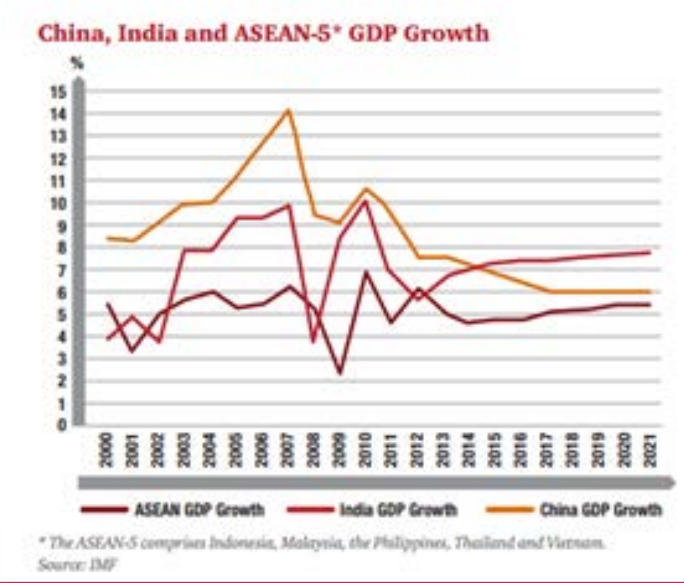
MINERAL EXPLORATION, Seasonally adjusted and trend

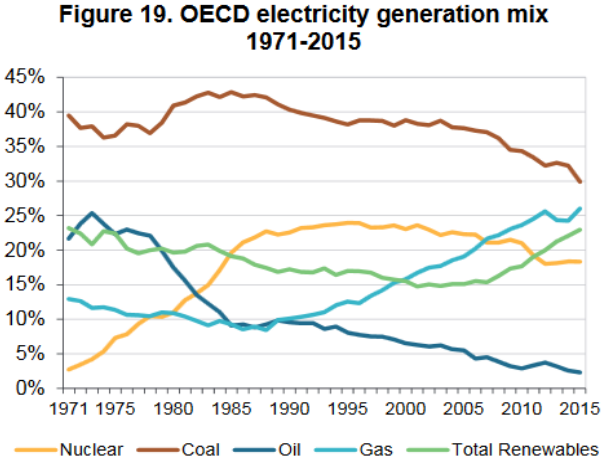


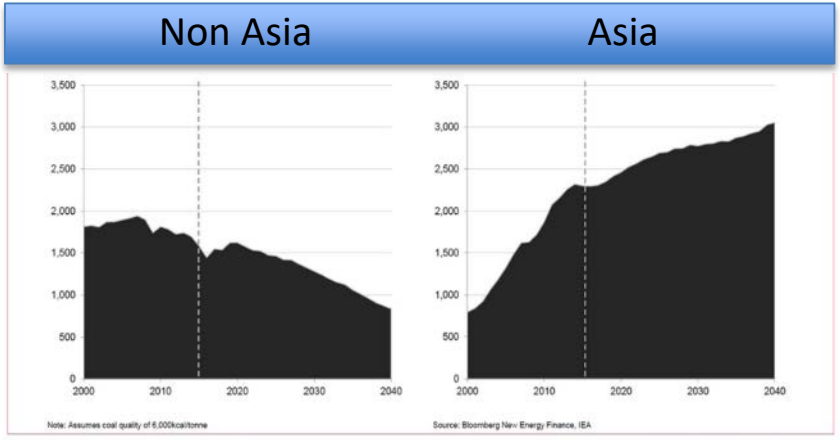
PETROLEUM EXPLORATION, Seasonally adjusted and trend



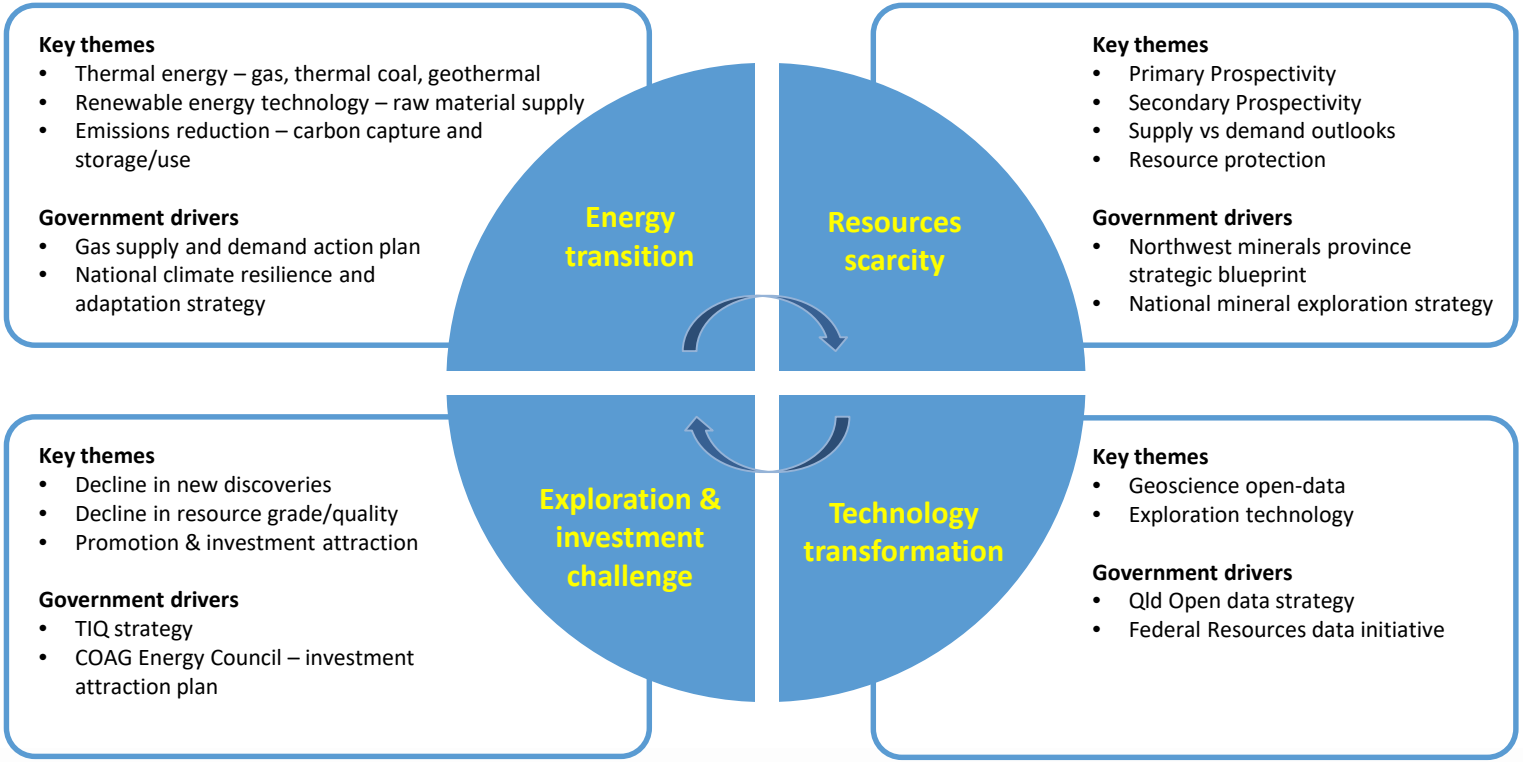
Do we keep doing what we have been doing? Or review our future drivers e.g. Transition to low carbon energy futures (gas and renewables)... and the differing levels of demand?







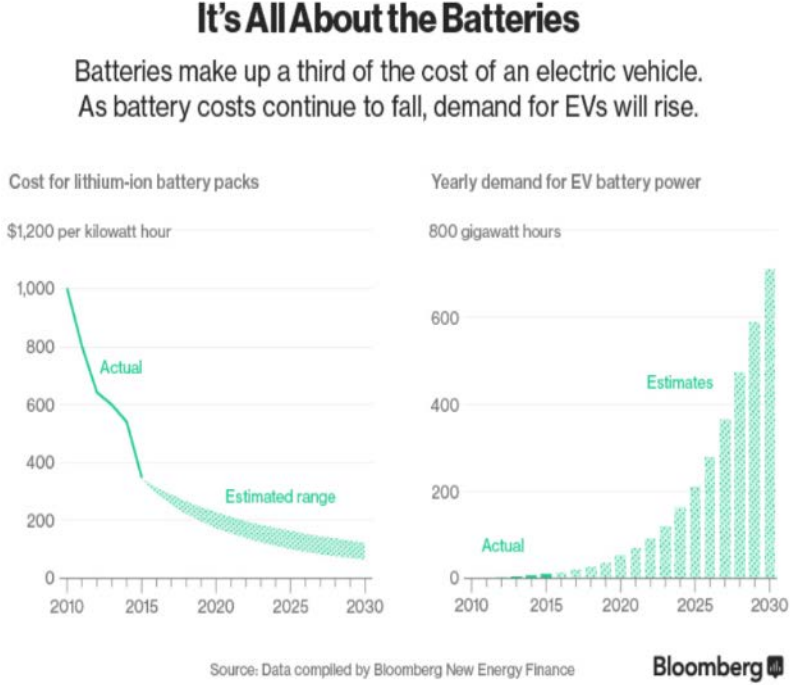
DNRM is focussing on 4 key strategic themes



Energy Transition is increasing demand for more and increasingly sophisticated batteries

- Renewable energy production relies on batteries to transition to the main stream
- Batteries required at several levels
- Decentralisation
- Cost of transition?

China to invest $361 billion into renewable power by 2020



Question: Can we influence the future?

- Our industry need to supply the materials needed
  - Lithium, cobalt, graphite

- Failure to supply the demand?
- We can influence the future

What to do if things go wrong?

GRID POWER
Batteries can be larger
Vanadium flow batteries?

DECENTRALISED POWER
- **Batteries can be larger**
- **Sodium ion batteries?**

Managing supply is the challenge…

How can we discover new base metals deposits needed to replace dwindling supplies?

- Industrial Minerals
- Should we be recycling tailings?
- Critical Elements – basis for new technologies, alloys etc.

Resource Sustainability (Critical elements):

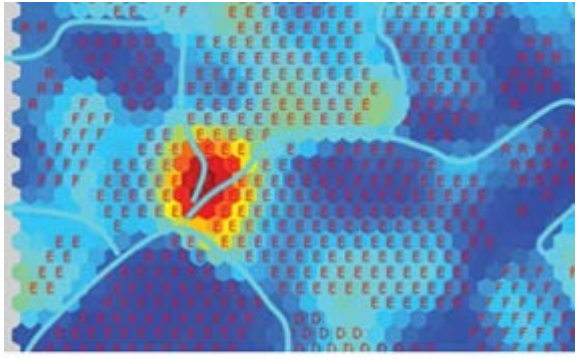
- Critical elements are those which underpin new technologies and which have limited supply issues.
- Include Rare Earth elements, Li, Ta, Nb, Co and carbon
- Critical elements are typically ‘spice elements’ where only small amounts are used and do not represent attractive exploration targets
- High value end is in the technologies these elements support

Encouraging and supporting Exploration success

- What do we need to do to promote exploration success? Uncover, CRC's,
- CSIRO's Deep Earth Imaging, Exploration through cover, Rapid resource characterisation, Big data for earth sciences

FastGrade: on-site elemental drillhole analysis >

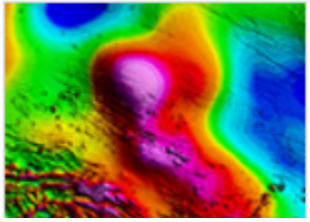
Detecting gold with x-ray vision >



SiroSOM self organising maps: complex datasets made simple >

Making the most of Technological advancements

- What technologies do we focus on to promote exploration investment and success? Supply of data
- R&D
- Keeping track of technology advances to predict which commodities will be needed (graphene)



How to extract more information from geophysical data

OCTOBER 6, 2016 EXPERTISE

Give them data and they will come

AUGUST 4, 2016 EXPERTISE