

Increasing concerns re world **cobalt** supply for an expanding lithium ion battery industry could lift BPL from a junior explorer to a substantial metals producer.

&

New heavy mineral sand (Ti-Zr) Project

Broken Hill Prospecting Limited (ASX code BPL) has identified twenty prospective HMS deposits in the Murray Basin South of Broken Hill



Ian Pringle
(27 August 2014)

*Mining
NSW
2014*₁

Cautionary Notes

Disclaimer

This presentation contains forward-looking statements that involve subjective judgement and analysis and accordingly, are subject to significant uncertainties and risks, many of which are outside the control of, and are unknown to, Broken Hill Prospecting Pty Ltd (“BPL”). In such circumstances, the forward-looking statements can be identified by the use of forward-looking words such as “may”, “will”, “expect”, “intend”, “seek”, “estimate”, “believe”, “continue” or other similar words.

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Competent Person Statement

Exploration activities and results contained in this presentation are based on information compiled by Dr Ian Pringle, a Member of the Australasian Institute of Mining and Metallurgy. Dr Pringle is the Managing Director of Broken Hill Prospecting Ltd and also a Director of Ian J Pringle & Associates Pty Ltd, a consultancy company in minerals exploration. He has sufficient experience which is relevant to the style of mineralisation and types of deposits under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code). The Inferred Mineral Resource was prepared and first disclosed under the JORC Code 2004. It has not been updated since to comply with the JORC Code 2012 on the basis that the information has not materially changed since it was last reported. The Potential is reported under JORC Code 2012. It is conceptual in nature and more drilling is required to further define it. However, there is no certainty that additional work will result in an upgrade of potential to Mineral Resource. Dr Pringle has consented to the inclusion in this report of the matters based on his information in the form and context in which it appears.

Introduction to Broken Hill Prospecting Ltd ('BPL')

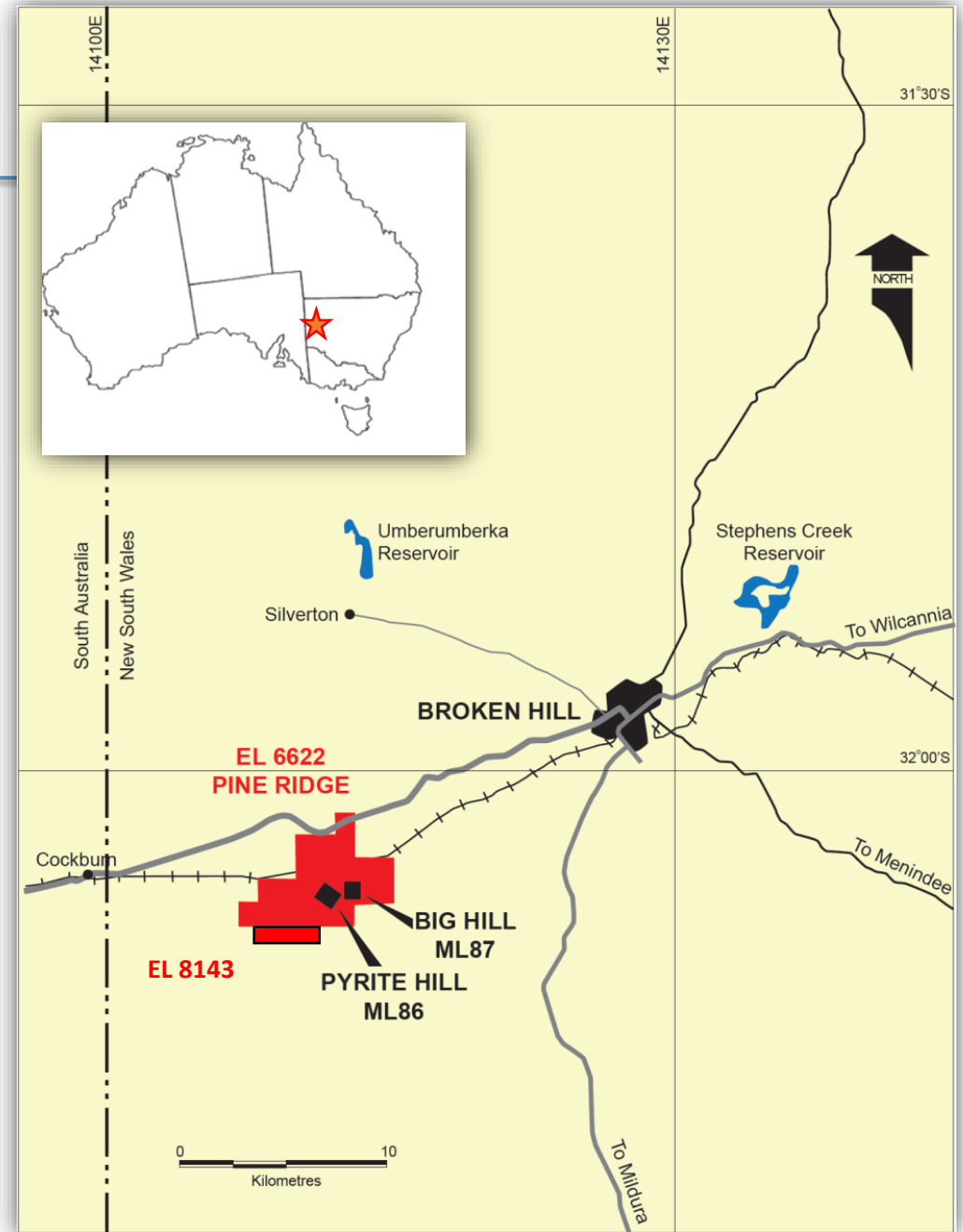
Each of the following has the potential to catapult BPL from a junior explorer into a world-class producer by attracting well-funded partners.

- ❑ BPL has a **world-class cobalt pyrite deposit**, a major strategic resource which could supply Co to a growing demand for electricity storage and rechargeable vehicles and a rapidly expanding battery industry.
- ❑ BPL could provide pyrite feedstock for **sulphuric acid** to supply mineral processing industries in eastern Australia which currently imports ~400,000t of acid each year.
- ❑ BPL have secured promising **Ti and Zr mineral sand prospects** which are high-grade and well located. Considering new technology and with forecast improvement in Ti & Zr prices, these have the potential to become profitable new mines.

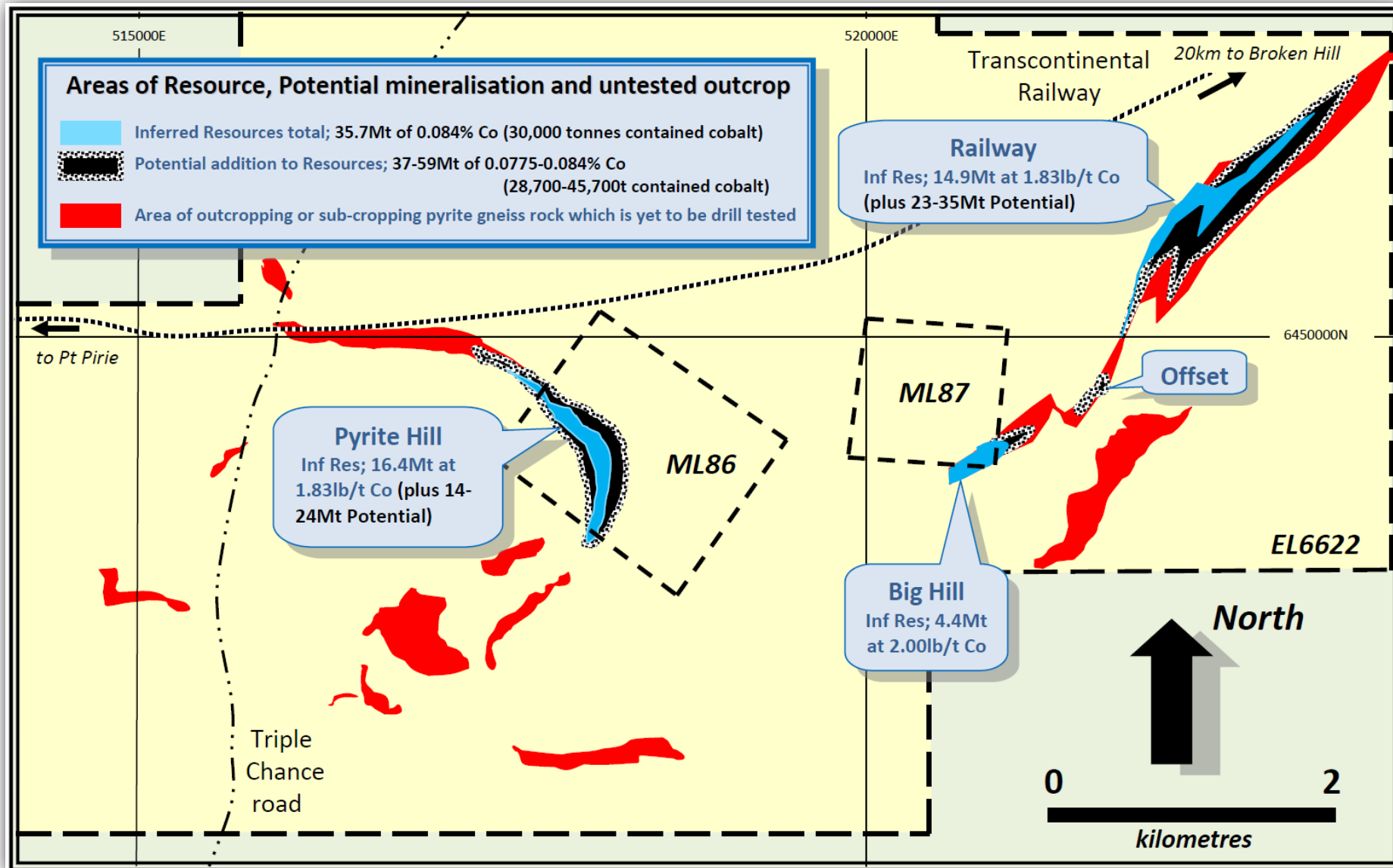
Cobalt-pyrite deposit.....

Location important for development

- ❑ Unique style of cobalt mineralisation
- ❑ Located beside main railway 25km SW of Broken Hill
- ❑ Outcropping, very large deposits
- ❑ In 2012/2013 BPL discovered new deposits and untested potential
- ❑ Processing of pyrite to recover Co by sulphide roasting to produce sulphuric acid

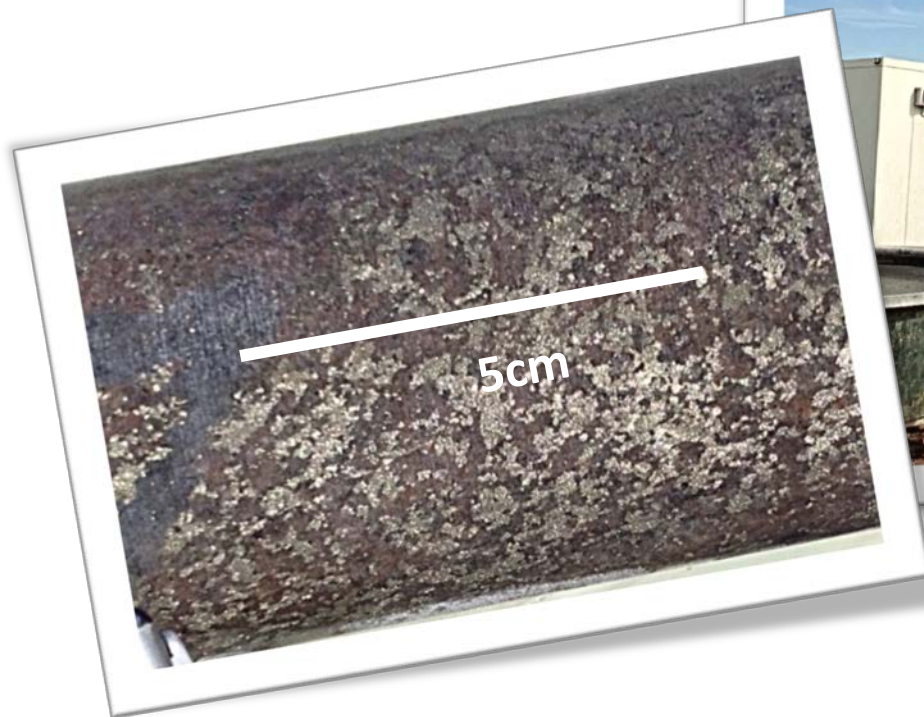


Resources and potential... are very large & near surface



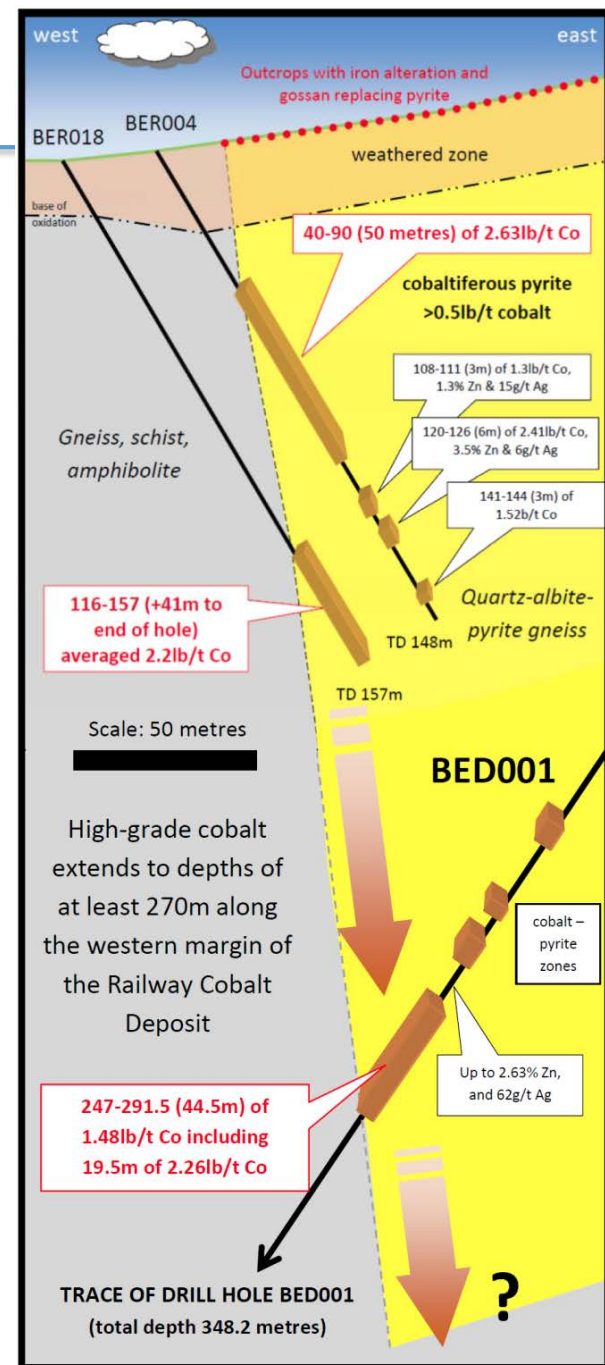
Co-pyrite extends to considerable depth

The cobalt-pyrite (FeS_2) has no Pb, As, Hg, Cd or other 'toxic' metals. Gangue minerals are 'inert' quartz and Na feldspar.



2013 drilling
at BED001

**Potential to make a cobalt-pyrite concentrate
(0.45% Co) - a premium feed for sulphide roasting**



BPL's cobalt resources have very high in-ground value

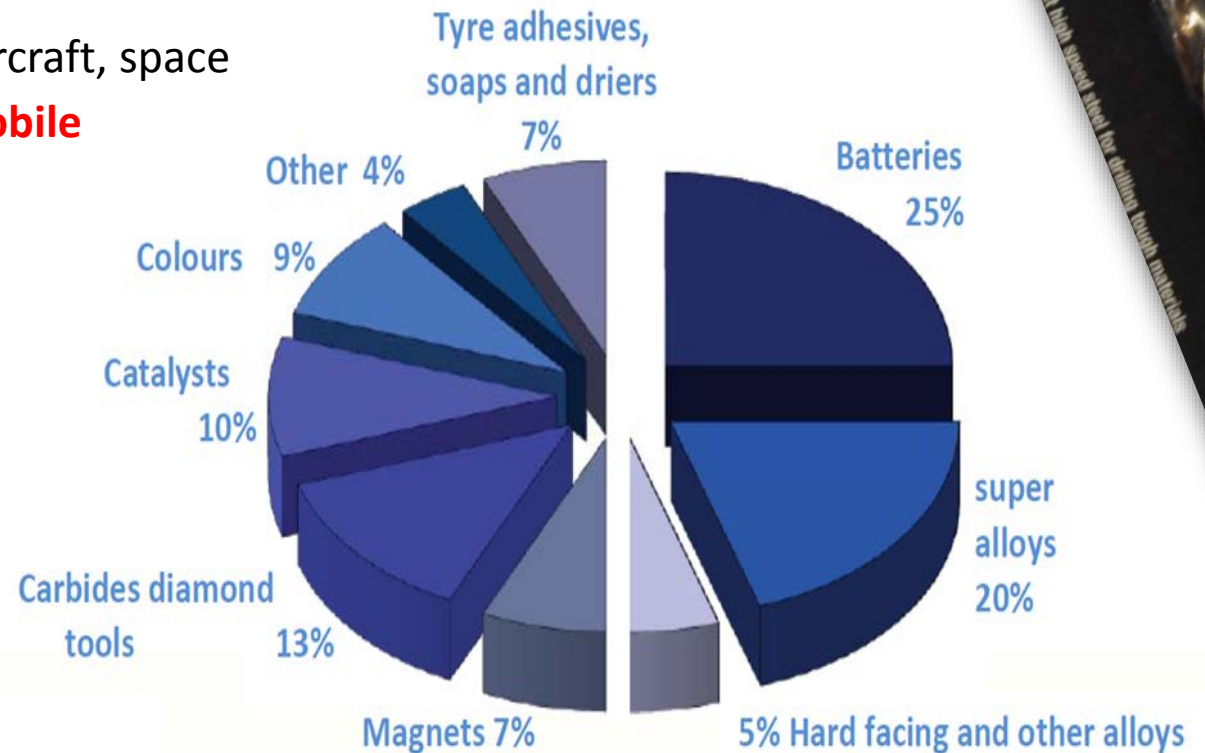
BPL Mineral Resources*	ASX listing, February 2011	August 2014
Pyrite resource estimate (Inferred Resource)	15 million tonnes (Mt) of 0.085% Co (12,750 tonnes (t) of contained cobalt)	35.7Mt of 0.084% Co (30,000 tonnes contained cobalt)
Potential* pyrite resource estimate (additional to Inferred Resource)	None identified	37 - 59Mt of 0.0775 – 0.084% Co (28,700-45,700t contained cobalt)

**Note that the Inferred Mineral Resources were prepared and first disclosed under the JORC Code 2004. They have not been updated since to comply with the JORC Code 2012 on the basis that the information has not materially changed since it was last reported. The Potential is reported under JORC Code 2012. It is conceptual in nature and more drilling is required to further define it. There is no certainty that additional work will result in an upgrade of Potential to Mineral Resource.*

Co price (LME) on 22 August 2014; ~US\$32,250/tonne

What is cobalt? A metal of the future

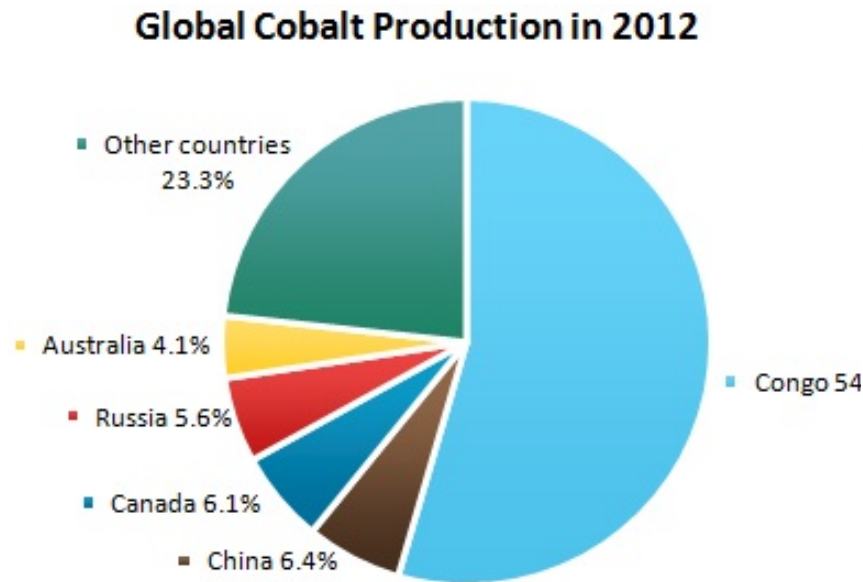
- ❑ Co is special... hard, heavy, high melting temperature, strong magnet
- ❑ Co a 'Strategic Metal' in the USA, China, Japan and EU
- ❑ Co price in last 5 years: \$12-\$50/lb (\$22,000-\$110,000/t)
- ❑ Co is widely used:
 - ❑ superalloys for turbines, jets, military, aircraft, space
 - ❑ **rechargeable batteries (electric cars, mobile phones, laptops....). Many lithium-ion batteries contain up to 60% Co**
 - ❑ a strong magnetic
(better than Ni and Fe)
 - ❑ pigment, bright blue colour
 - ❑ vitamin B12 (blood and brain)
 - ❑ catalyst, jewellery,
medical isotopes,
cosmetics, etc.



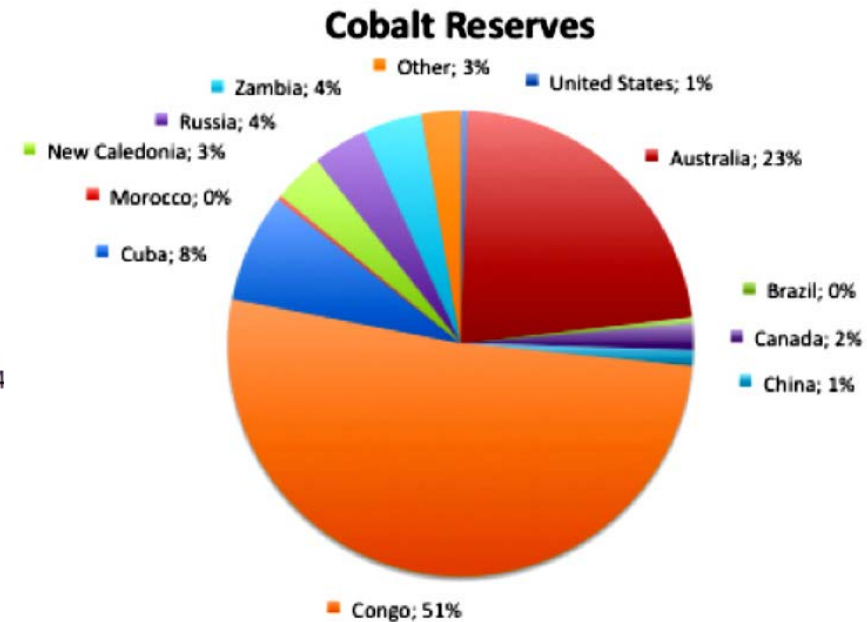
Why is cobalt special?

No cobalt is mined in USA, Japan, Korea or EU

- ❑ Mostly bi-product from some Cu or Ni mines
- ❑ ~100,000t Co produced annually;
 - ~55% from DR Congo, ~45% refined in China
 - >80% consumed in USA, Japan, China and European Union.
- ❑ DR Congo: ~51% of world Co reserves, ~55% production
 - **uncertainty of future supply, growing world demand.**



Source: <http://mcgroup.co.uk/researches/cobalt>



Source: http://www.30bananasaday.com/forum/topics/detailed-description-on-how-hydroxocobalamin-b12-is-manufactured?commentId=2684079%3AComment%3A2432572&xg_source=activity

Tesla Motors "gigafactory" plans to make electric vehicle battery packs for 500,000 electric vehicles annually

2.5 kg cobalt (Prius) >1 million Toyota hybrids in 2013

... and increasing

6-9 kg cobalt (S, X, GenIII) >0.5 million Tesla units by 2020

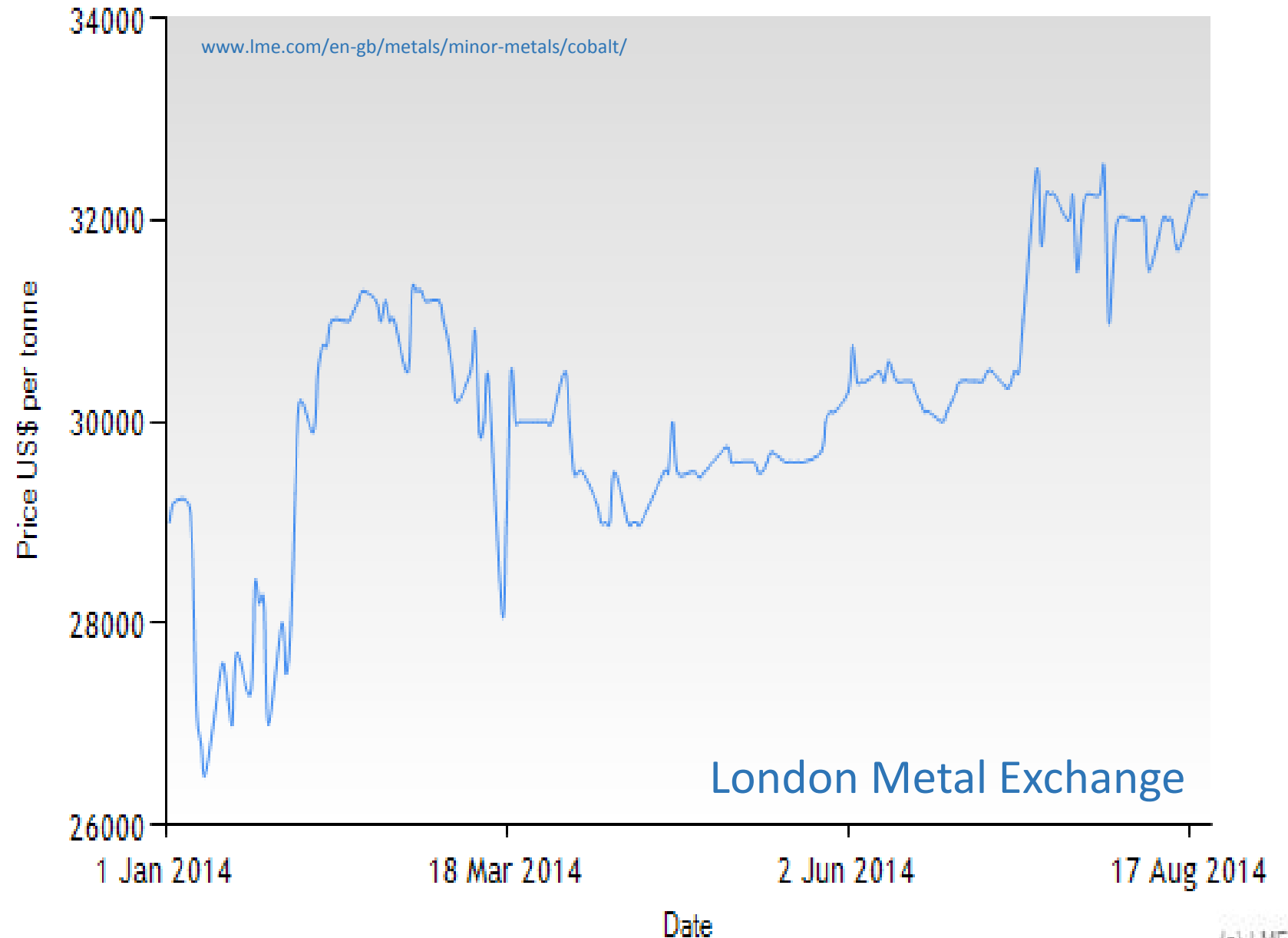
... and increasing

General Motors (Chevy volt, Chevy Spark), BMW.....

All use cobalt batteries and are planning to make >>>> more

The cobalt price is showing signs of recovery.

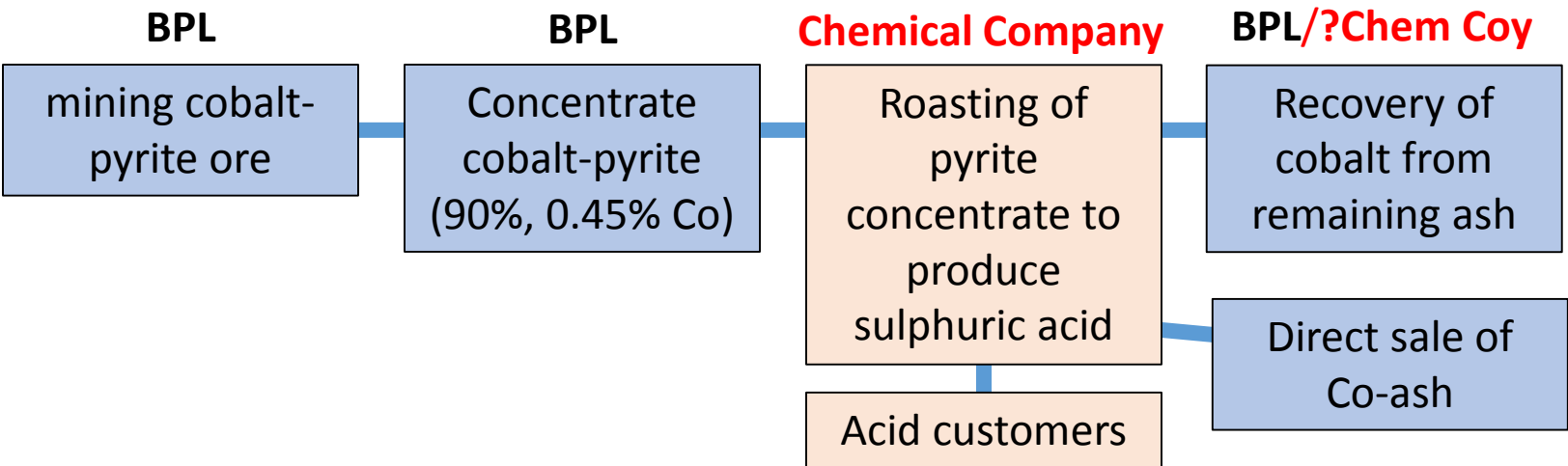
Will future supply/demand pressures take Co price to +\$100,000/t?



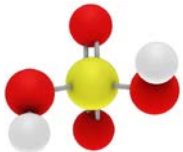
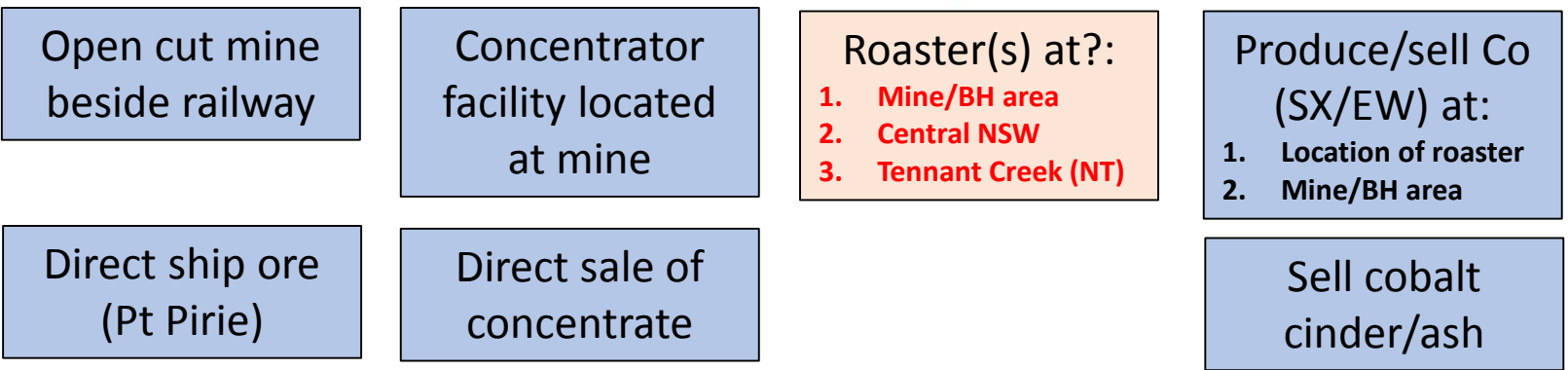
(c) LME

Development scenario – to produce cobalt and H₂SO₄

Path of conceptual development



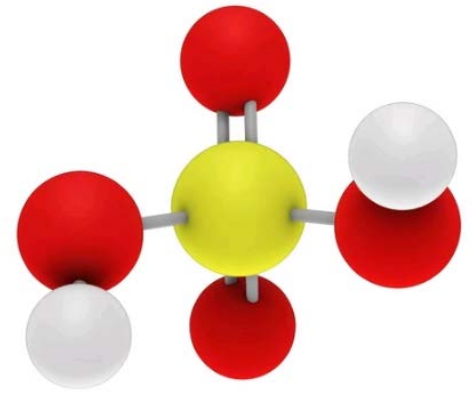
Options for development



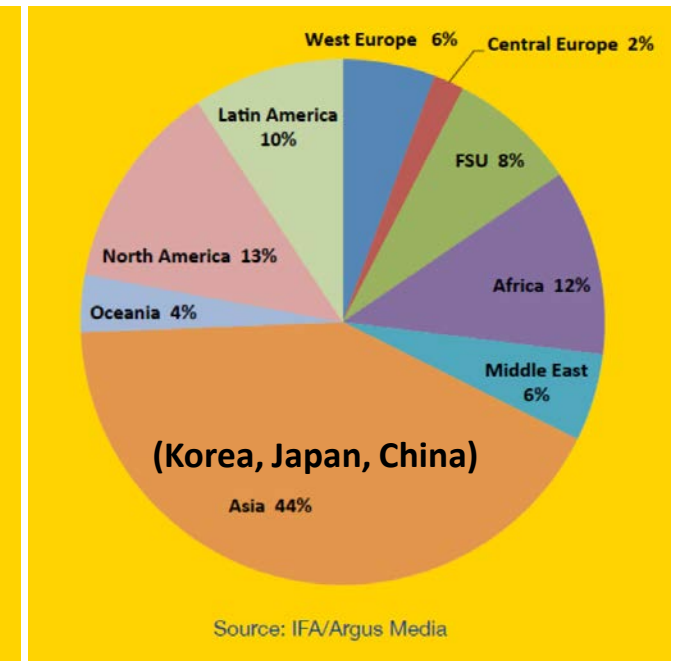
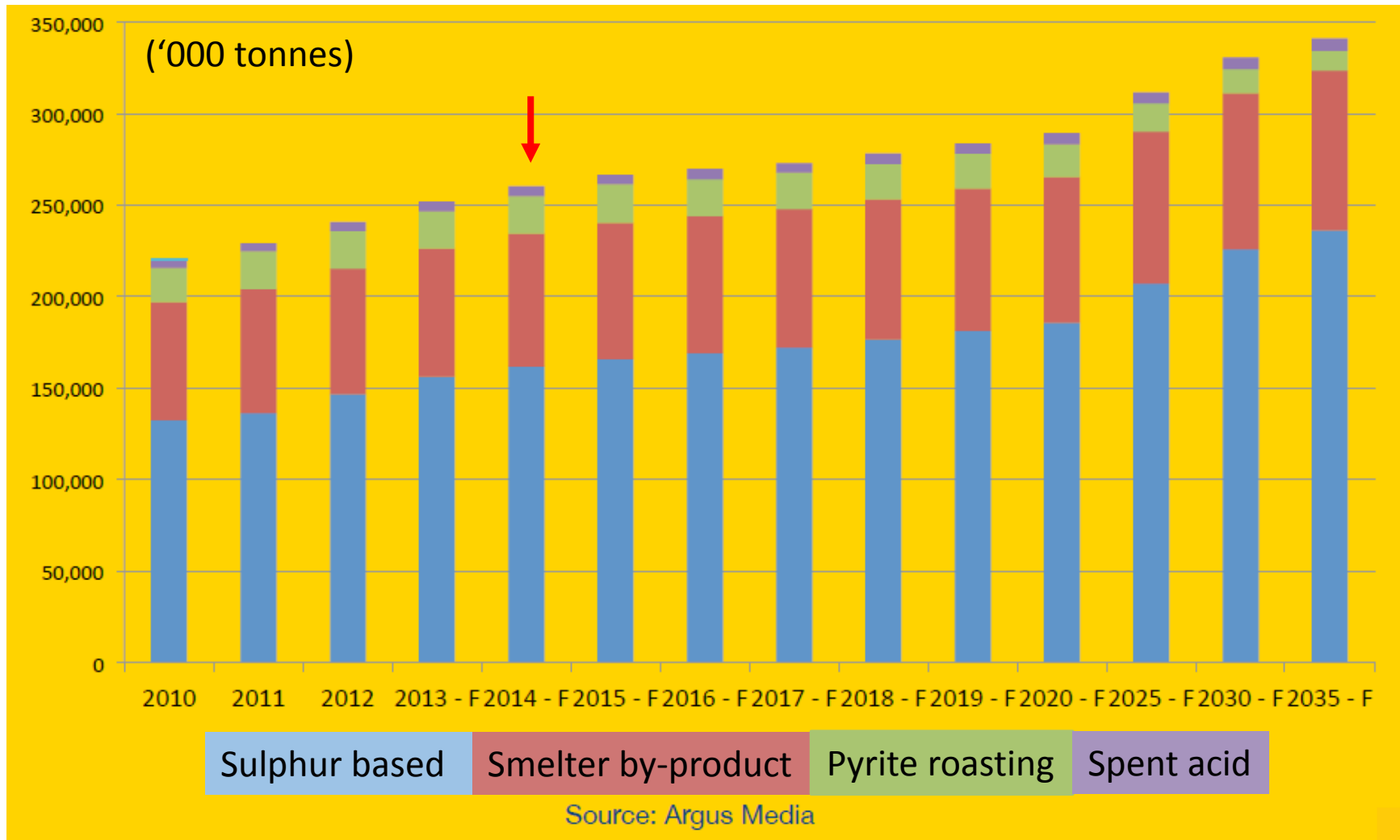
Sulphuric acid supply/demand in Australia

Australian issues include:

- Net importer of sulphuric acid (and sulphur)
- Freight, handling, storage from northern hemisphere producers
- Adds to costs as well as uncertainty of supply
- Future production decline is forecast for Australia
- Supply is a deterrent for new projects - sulphuric acid can make up a significant proportion of CAPEX and OPEX for many projects.
- East Australia contains some of the world's largest undeveloped phosphate, Ni laterite, ilmenite, uranium, scandium and REE deposits.
 - Acid leaching trials on ROM ore at BHP Billiton's Olympic Dam??



Sulphuric acid global production forecast



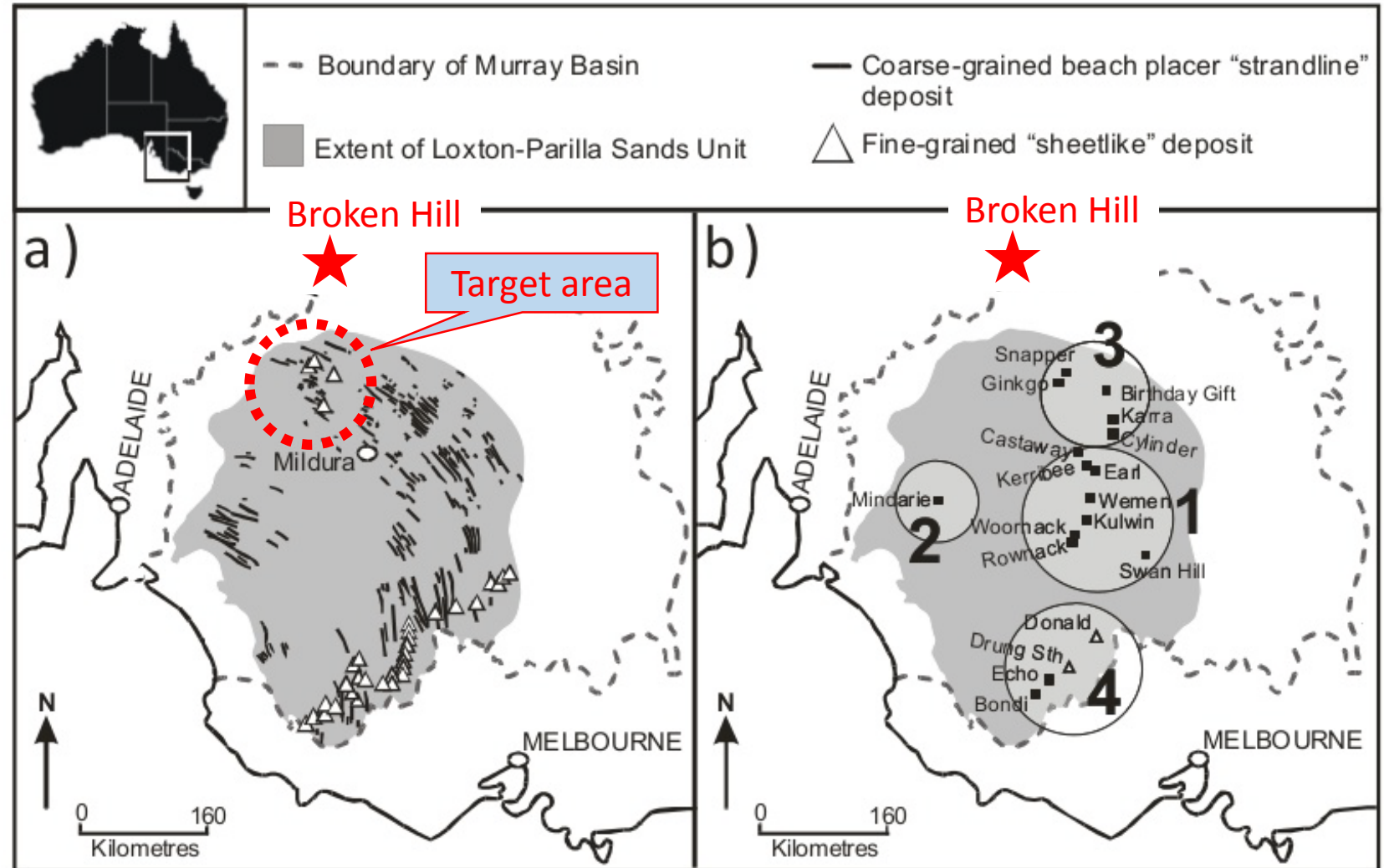
- ~90% of H_2SO_4 is produced in the northern hemisphere
- ~50% is used to make phosphate fertiliser

Courtesy of Dr Robert Boyd, Elbury Sulphur Consultants Inc, March 2014

Murray Basin mineral sand deposits - a new project for BPL

Fine-grained, sheet-like Heavy Mineral Sand ('HMS') deposits are well known along the southern margin of the Murray Basin.

Deposits similar to these have been discovered south of Broken Hill. These are less well known but several have negligible overburden and considerable HM content.

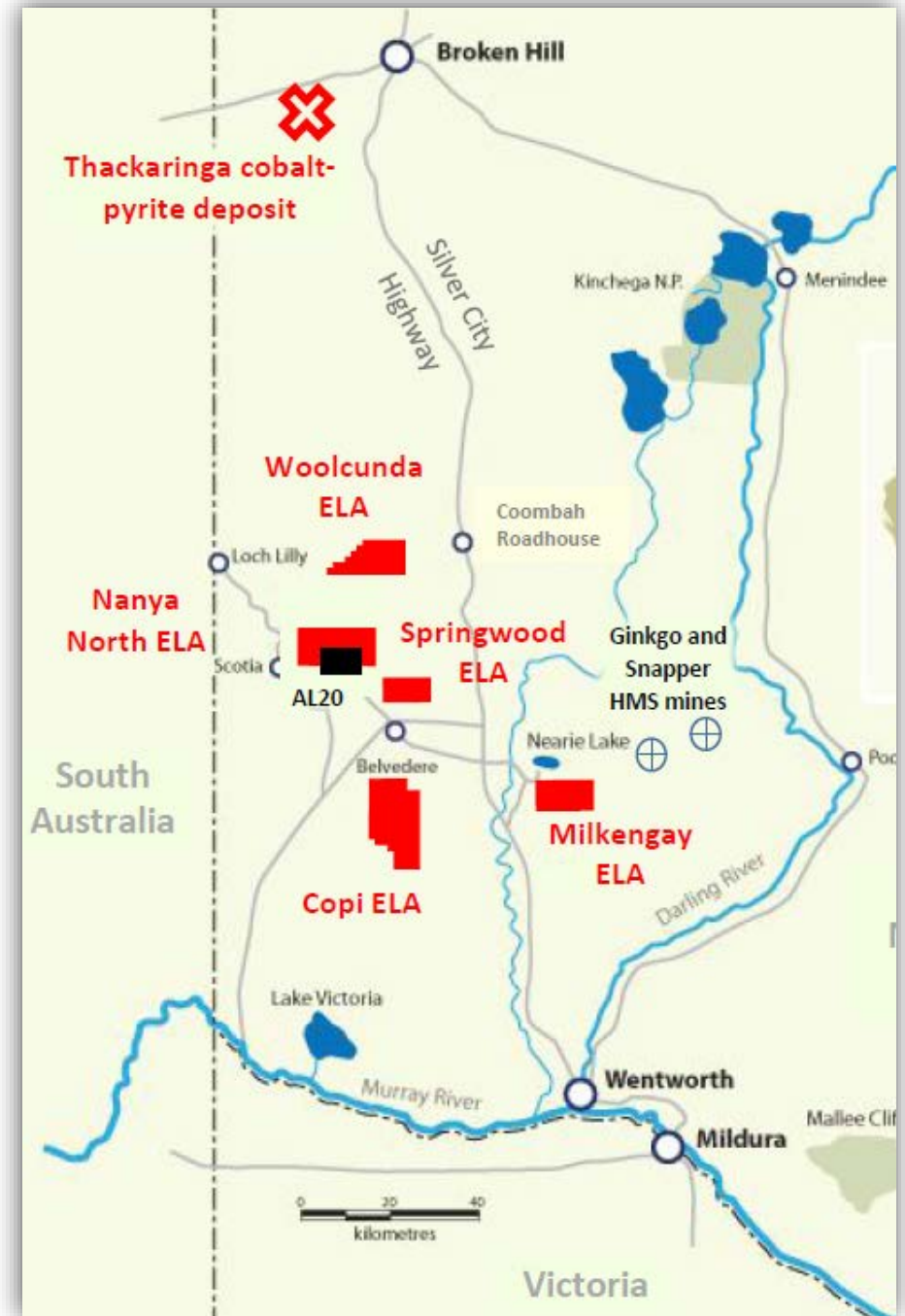


Modified from: David Freeman et al, CSIRO, Processing Murray Basin Mineral Sands, 5 March 2014

Tenement Map, SW NSW

- ❑ Five areas selected
- ❑ Exploration Licence applications (lodged, June 2014)

ELA (Group 10, mineral sands)	area		HMS Prospects
	units	km ²	
Woolcunda 5048	59	171	Magic, Majar
Nanya North 5049	40	116	Massidon, Strand A, Strand B, Nanya 1, Plain Tank
Springwood 5050	32	93	Springwood
Milkengay 5051	65	188	N226(N265), N264, 500, Milkengay
Copi 5052	100	290	Copi, Bulli, Circus, Wemba, Tarawi, Yabbi and Nulla
<i>Total</i>	<i>296</i>	<i>858</i>	



HMS target

Start-up projects will depend on grade, HM make-up, depth and grainsize.
BPL target is 25-50Mt of >5%HM (with ~2-4Mt contained HM).

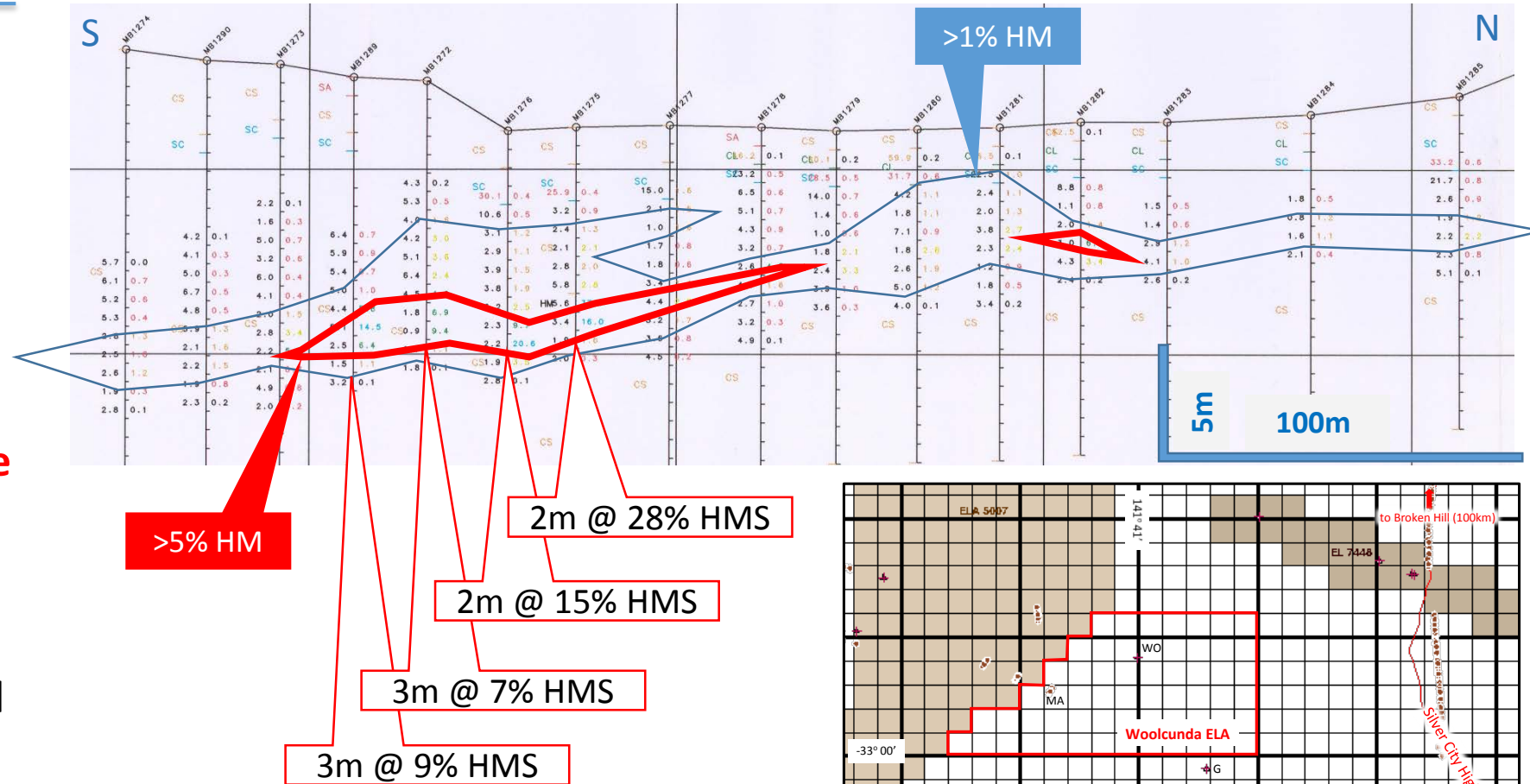


Project/Deposit	Tonnage	HM grade	Contained HM	HM composition (%)			
	Mt	%	Mt	ilmenite	leucoxene	rutile	zircon
Pooncarie/Ginkgo	133	3.9	5.2	69.9	nr	12.7	10.4
Mendarie C	39.5	3.6	1.4	65.2	6.6	4.9	19.1
Wemen	21.3	3.3	0.7	51	nr	28	11
Douglas/Bondi Main	40.2	9.5	3.8	35.2	7.4	10.3	8.1
Ouyen/Woomack, Rownack, Pirro	21	24	5.1	30.1	nr	17.9	9.2
Euston	35.4	14.2	5	42	21	12	10
Twelve mile/Birthday Gift	nr	nr	nr	49	8	19	11

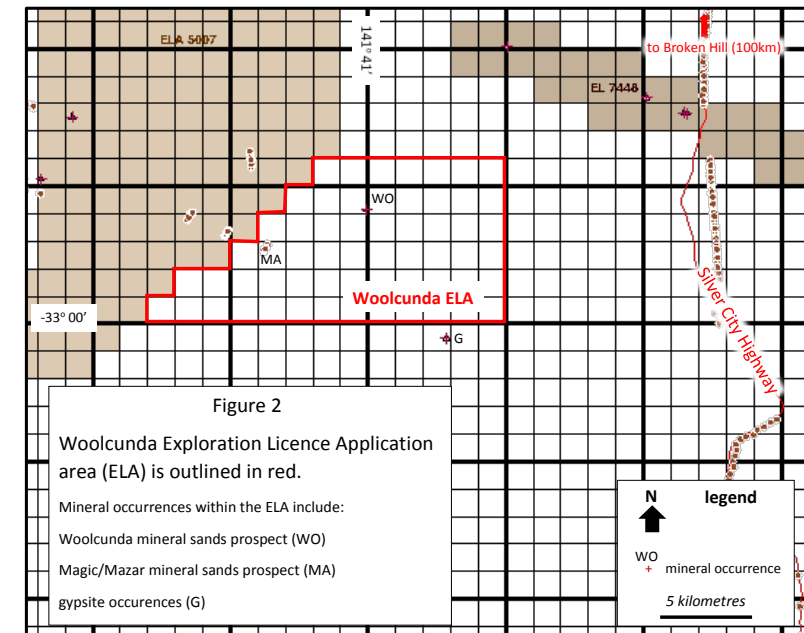
Murray Basin Strandline deposits. Adapted from David Freeman, CSIRO (2014)

Woolcunda ELA5048

- ❑ **The Magic Deposit** - an ilmenite dominated heavy mineral assemblage
- ❑ 3-25m cover
- ❑ HMS zones average 300m wide x 5m thick over >9km
- ❑ **High grade core ~110m wide x 2-3m thick with heavy mineral grades up to 2m of 28% HM**
- ❑ Ilmenite ~68%, rutile 3% and zircon 14.5%. HM range 75-120 microns

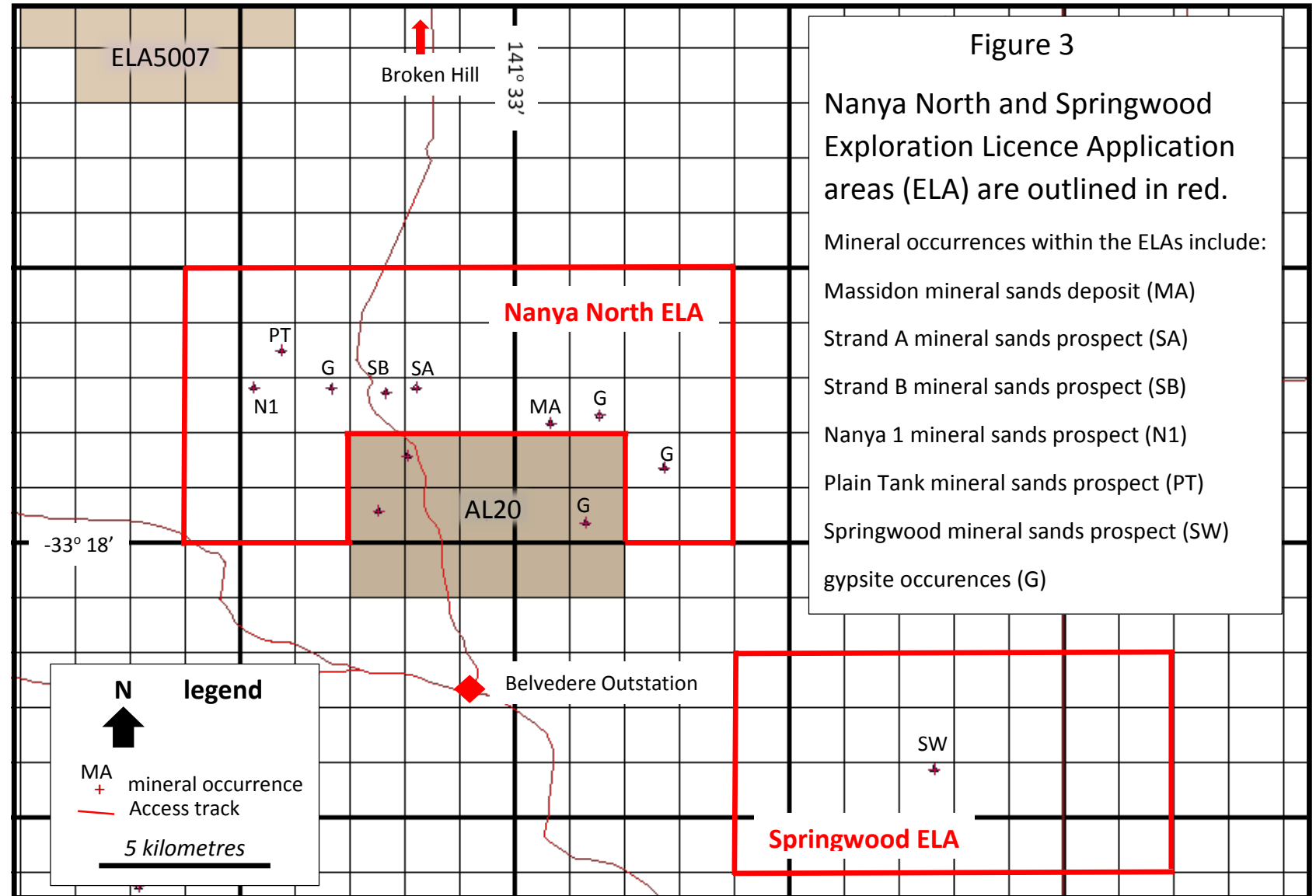


Magic Prospect - Section 209
Westralian Sands Ltd (19 March 1999)



Springwood and Nanya North (ELA5050, ELA5049)

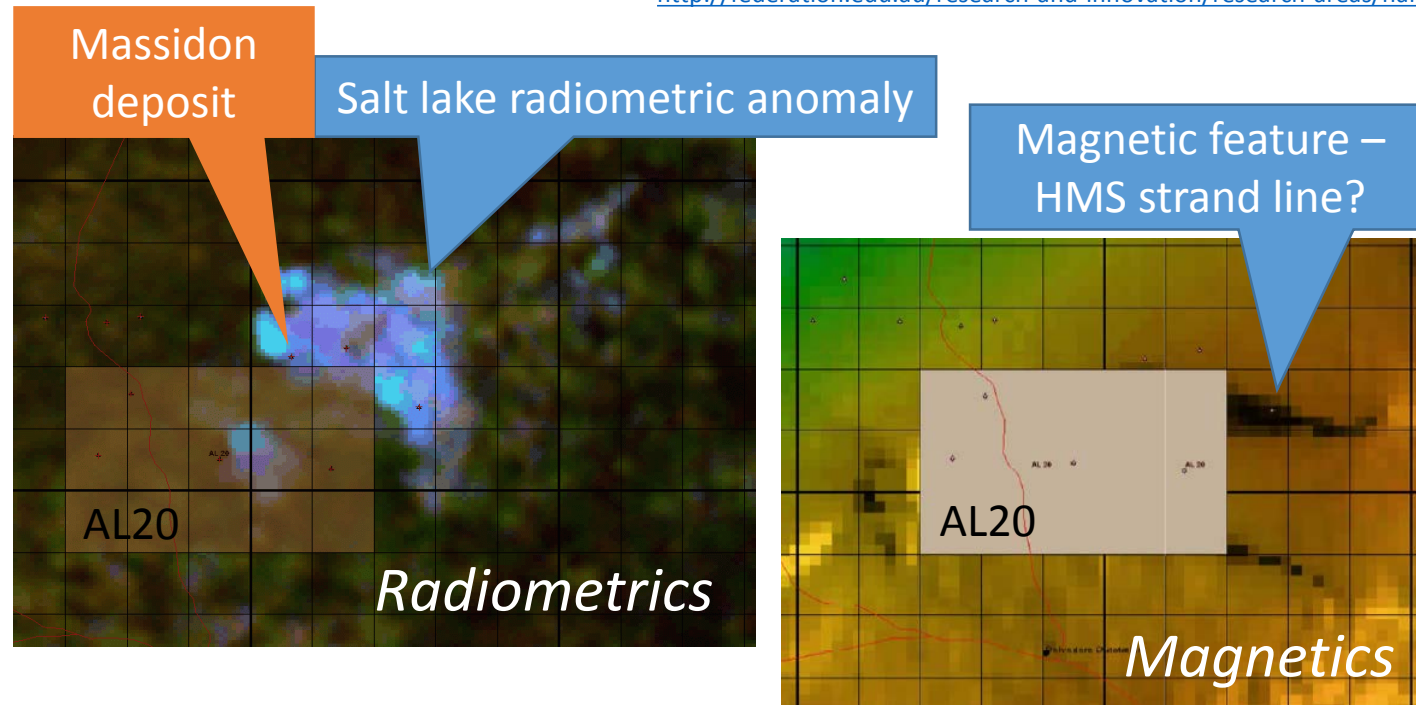
- ❑ Springwood mineralisation is **~250m wide, to 7m thick and averages 5% HM.**
- ❑ The deposit is fine-grained and may be offshore rather than strand line deposit.
- ❑ Limited information on overburden or length but HM occur within very fine-grained sands up to 20m thick.
- ❑ Improved spiral separation technology be the key to Springwood development.



Massidon Deposit, Nanya

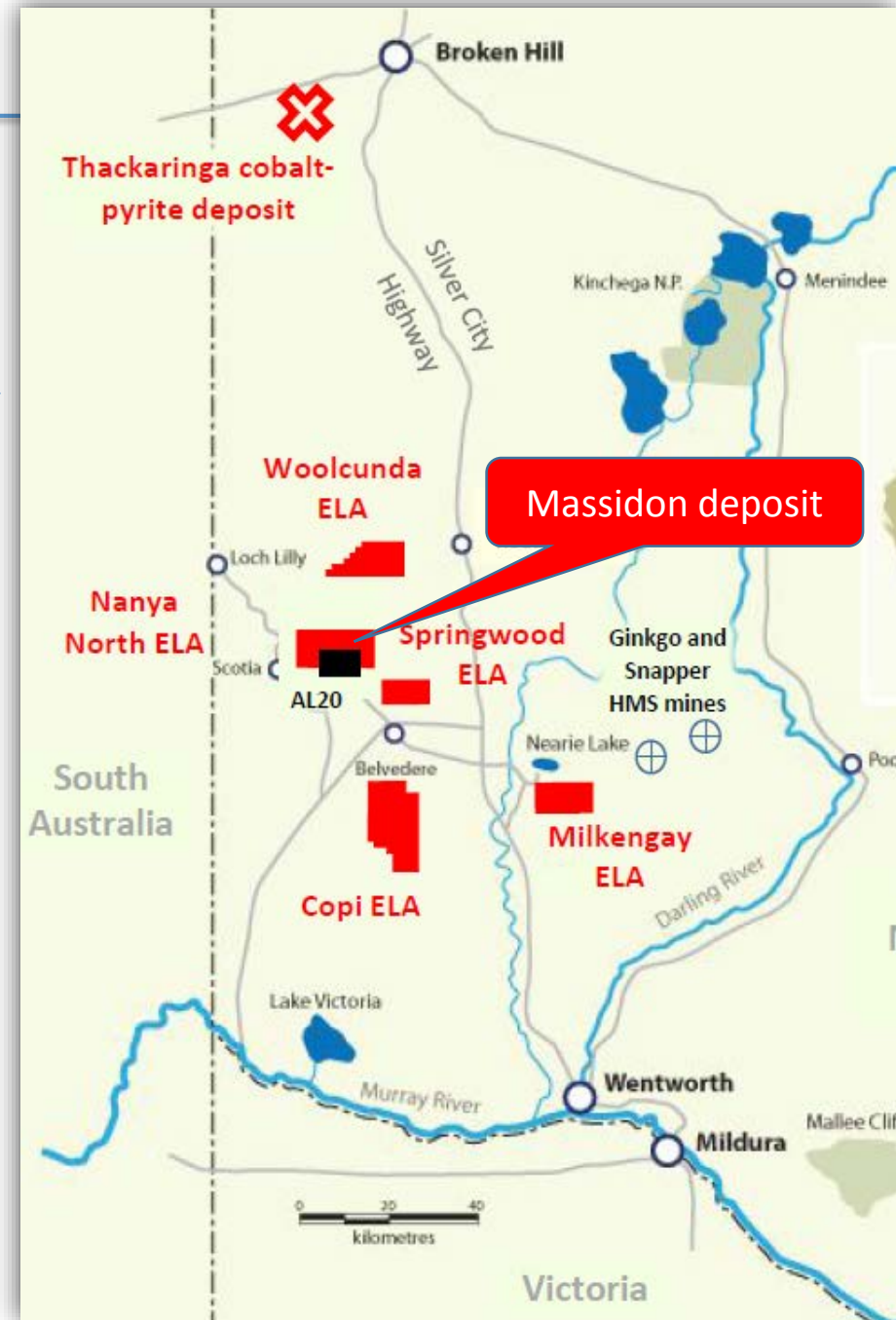
- ❑ Large deposit (>500Mt) defined by Bemax (Cristal) with good access
- ❑ Land owned by Federation University Australia (Ballarat)
- ❑ Potential for at/near-surface, high grade areas within ELA5049 as shown by radiometrics

<http://federation.edu.au/research-and-innovation/research-areas/nanya-station>



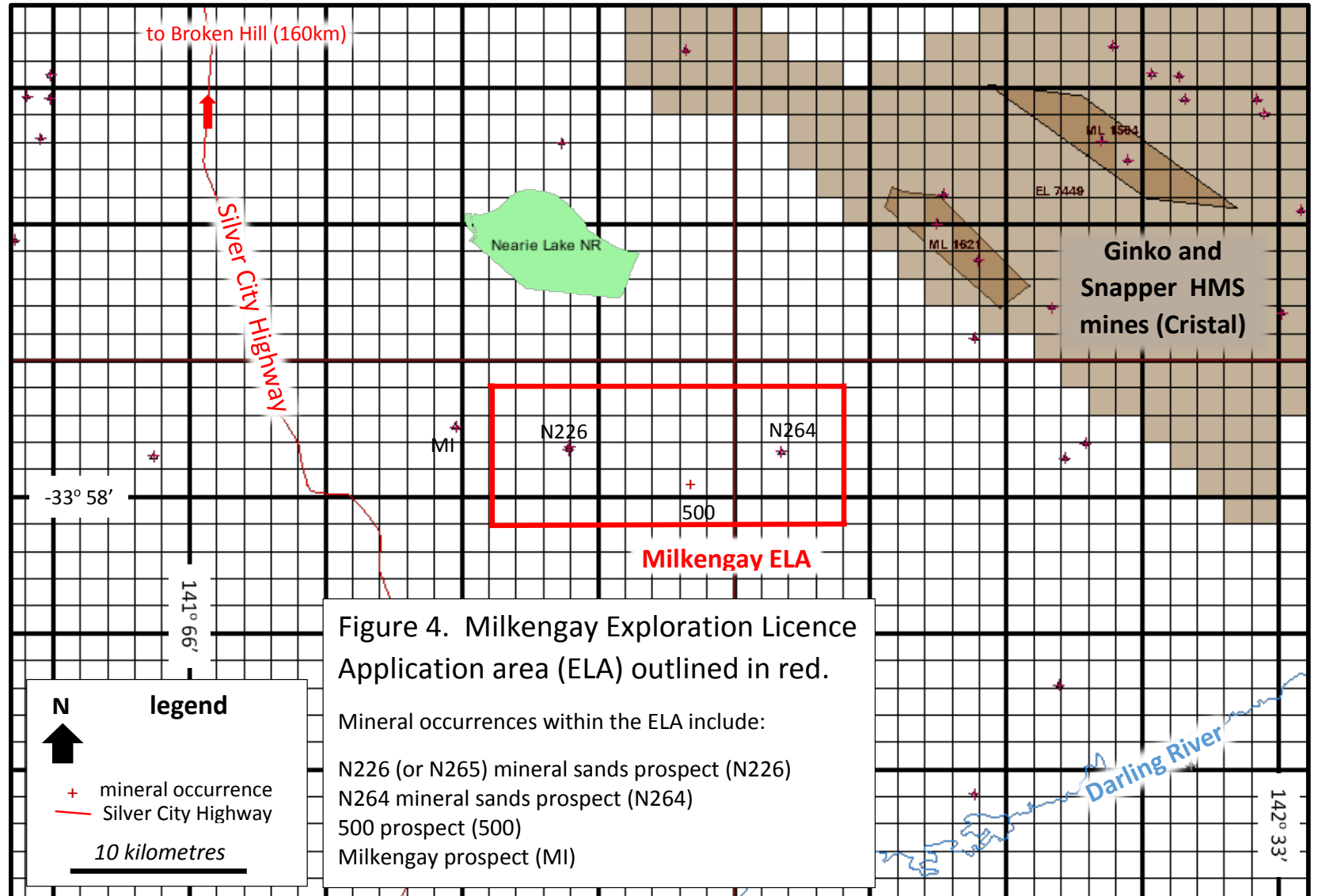
A summary of the Massidon Resource estimates reported by Bemax Resources (2006) can be located at:

www.asx.com.au/asxpdf/20061207/pdf/31000s7m52x1br.pdf



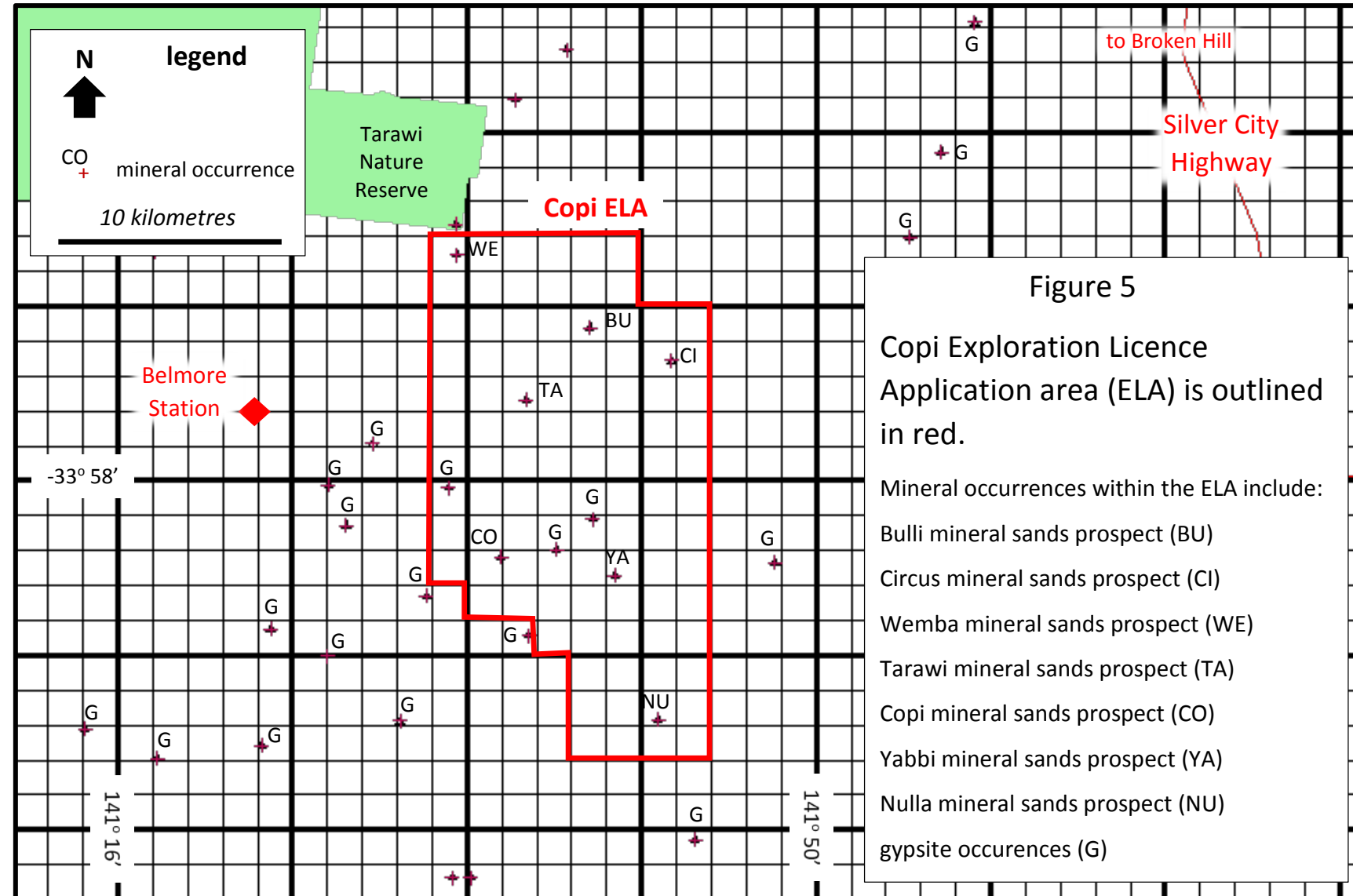
Milkengay ELA5051

- ❑ Prospects are SW of Cristal Mining's Ginkgo and Snapper HM mines.
- ❑ Previous workers report both gold and platinum showings in the HMS.
- ❑ **500 Prospect is ~10km long, av ~3% HM, 3.3m thick, 53m wide, 18m cover.**
(35% ilmenite, 41.6% rutile, 10.3% zircon).
- ❑ Milkengay Lake selestite/strontianite Sr prospect.



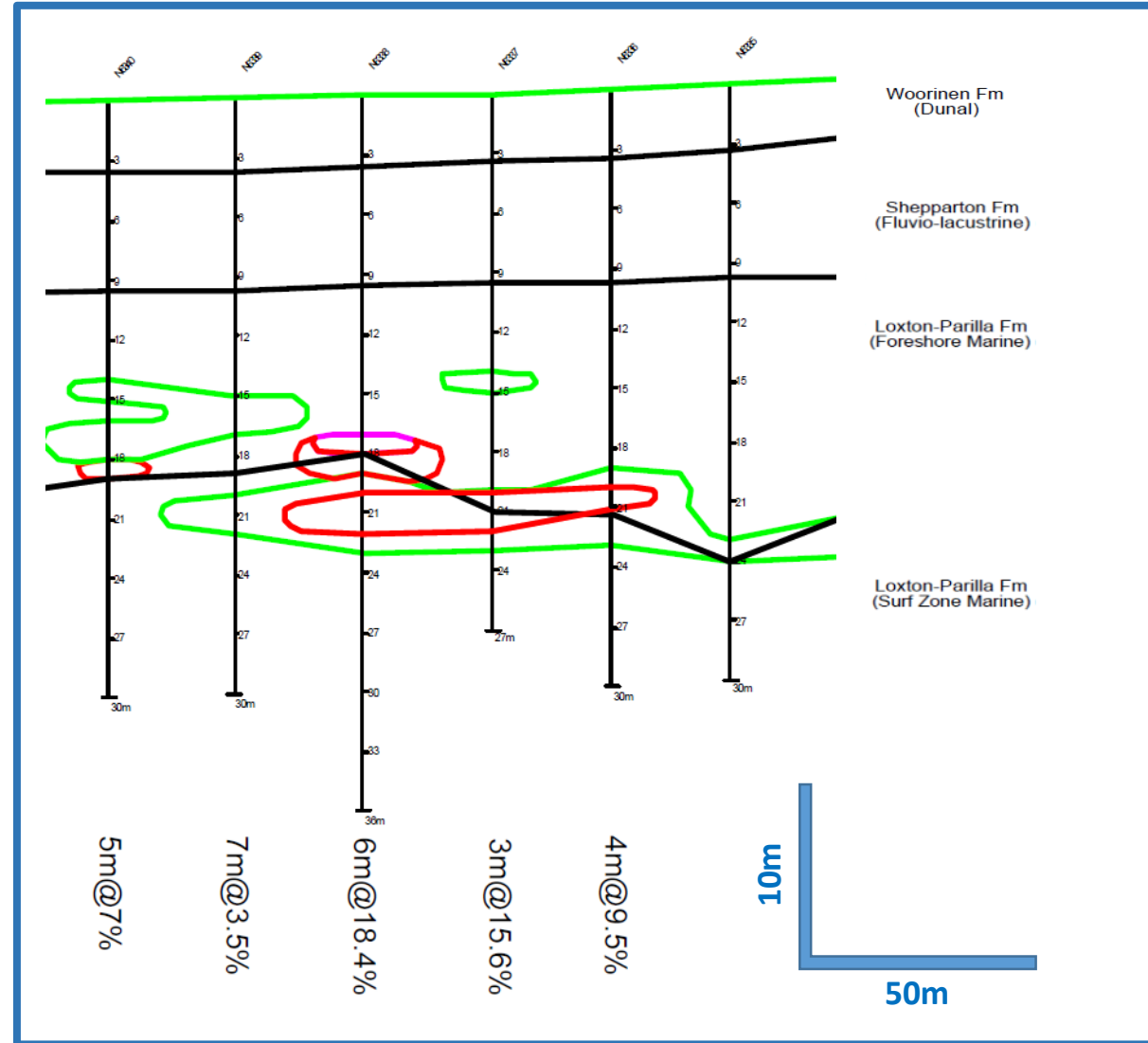
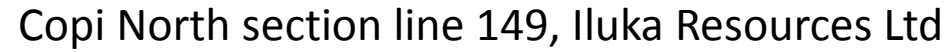
Copi ELA5052

- ❑ Series of stacked, deposits over zone of steep dipping shore-line. High-grade pods are enveloped by lower grade HMS.
- ❑ **Copi North is 15.5 km long, av 107m wide, 3.2m thick, with a average grade of 9.8% HM. (average 22.6m cover).**
- ❑ Economic assessment by early explorers showed that portions of Copi North could become economically viable.



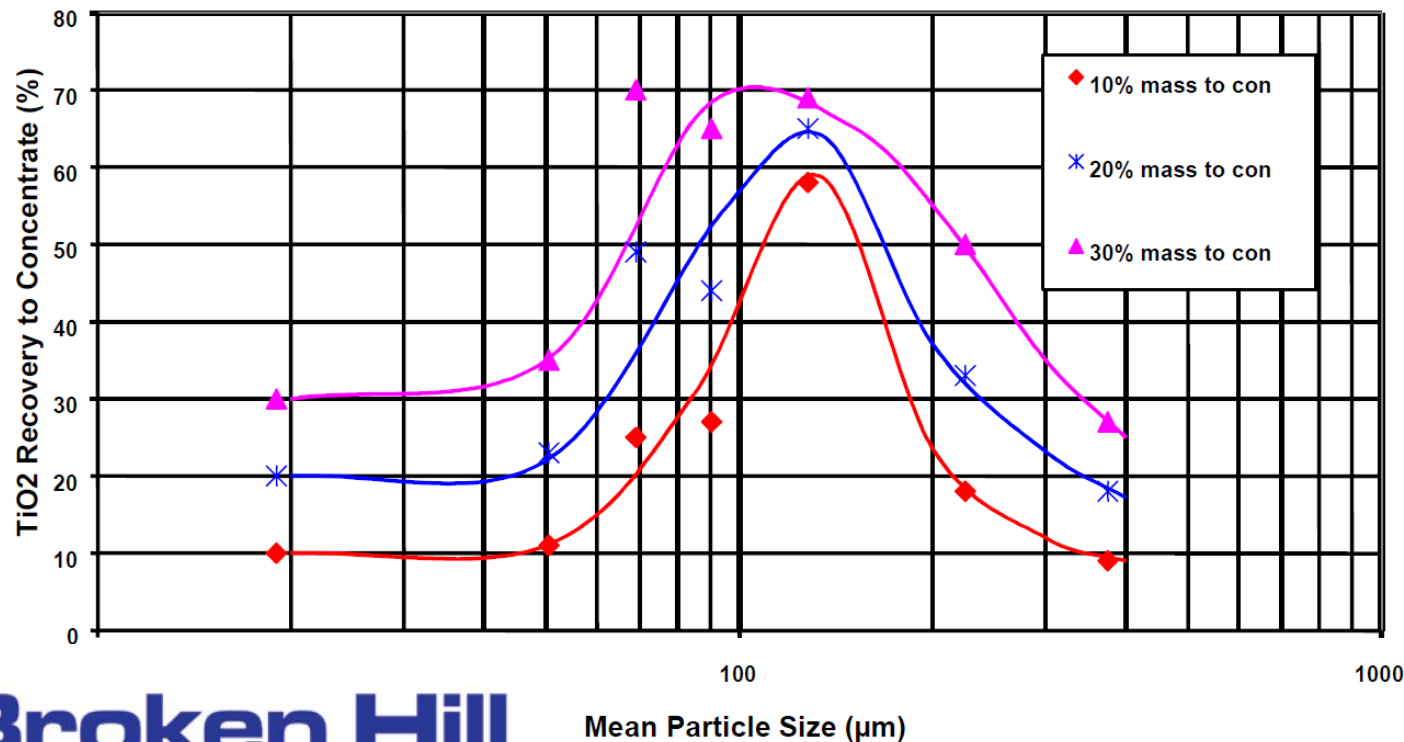
Copi ELA5052 (contin)

- ❑ Series of stacked, deposits over zone of steep dipping shore-line. High-grade pods are enveloped by lower grade HMS.
- ❑ **Copi North is 15.5 km long, and averages 107m wide, 3.2m thick, with a weighted average grade of 9.8% HM. (av 22.6m cover).**
- ❑ Economic assessment by early explorers showed that portions of Copi North could become economically viable.
- ❑ **Improved spiral separation technology be the key to Copi North, Magic, Nanya North, 500 and Springwood development.**



Advances in HM separation – FM1 spiral separator

- ❑ Spiral separators have undergone continuous development over 40 years with recent focus on the processing of progressively finer mineral particles.
- ❑ **New spiral separators will treat HMS material <0.1 mm.**



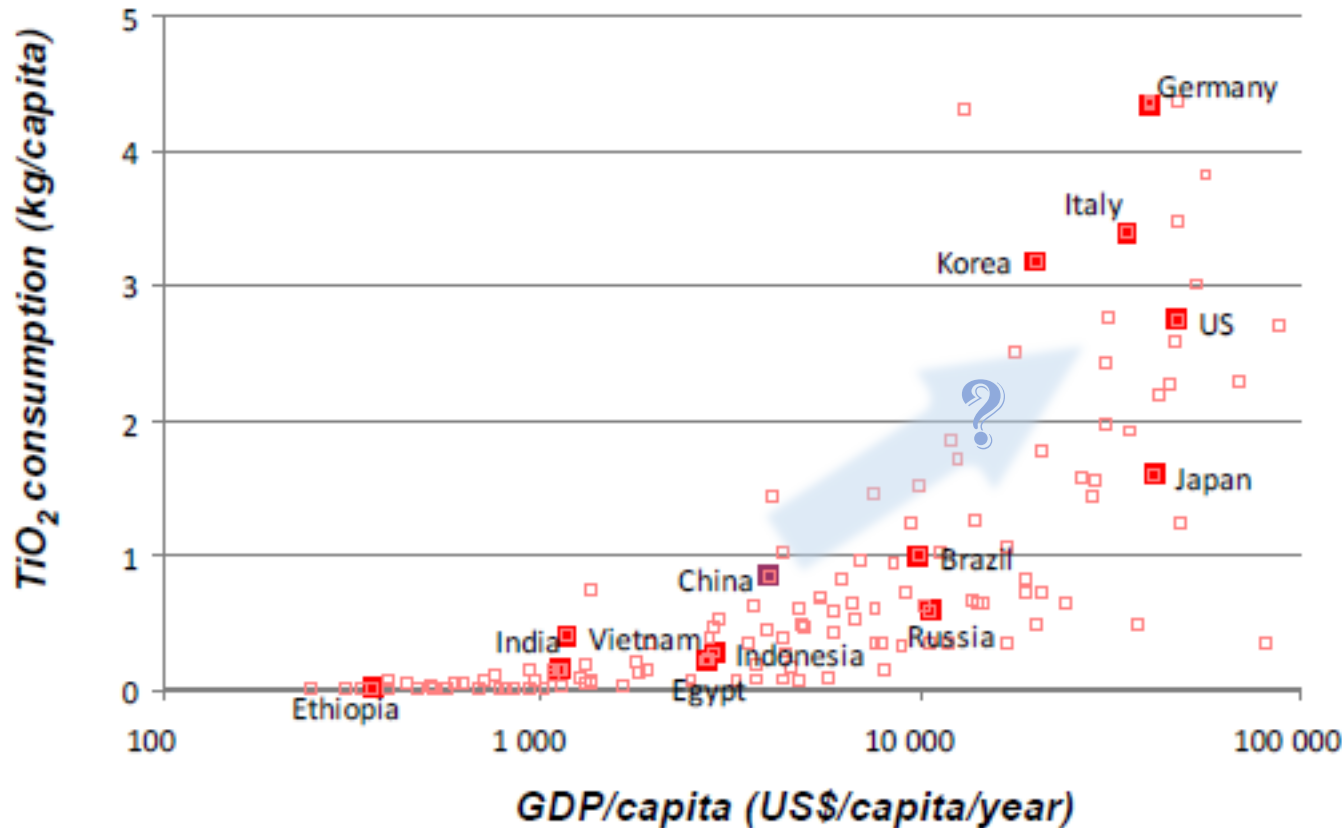
Mineral Technologies' FM1 spiral separator

- Extensive testing on a fine-grained Australian HMS.
- The size distribution was such that this feed would not normally be considered amenable to concentration using conventional spiral separators.
- Size-by-size recovery data indicate that maximum TiO₂ recovery occurs in the 100 to 105 micrometer range.

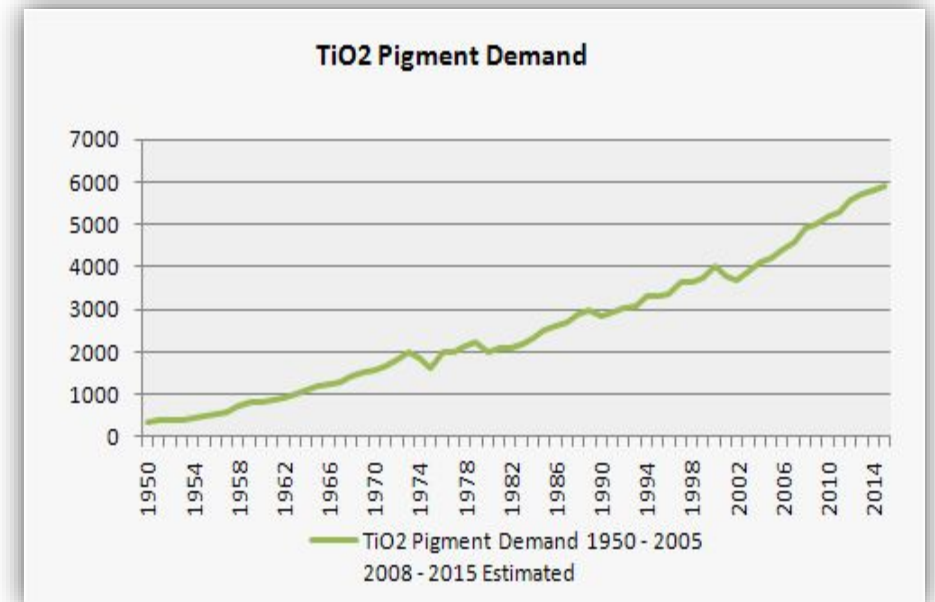
[www.mineraltechnologies.com/images/stories/documents/Technical%20Papers/Gravity%20Separation%20of%20Ultra-fine%20\(-%200.1mm\)%20Minerals%20Using%20Spiral%20Separators.pdf](http://www.mineraltechnologies.com/images/stories/documents/Technical%20Papers/Gravity%20Separation%20of%20Ultra-fine%20(-%200.1mm)%20Minerals%20Using%20Spiral%20Separators.pdf)

Ti demand is linked to economic growth

China is now recognised as the current market driver



Demand is expected to continue to grow



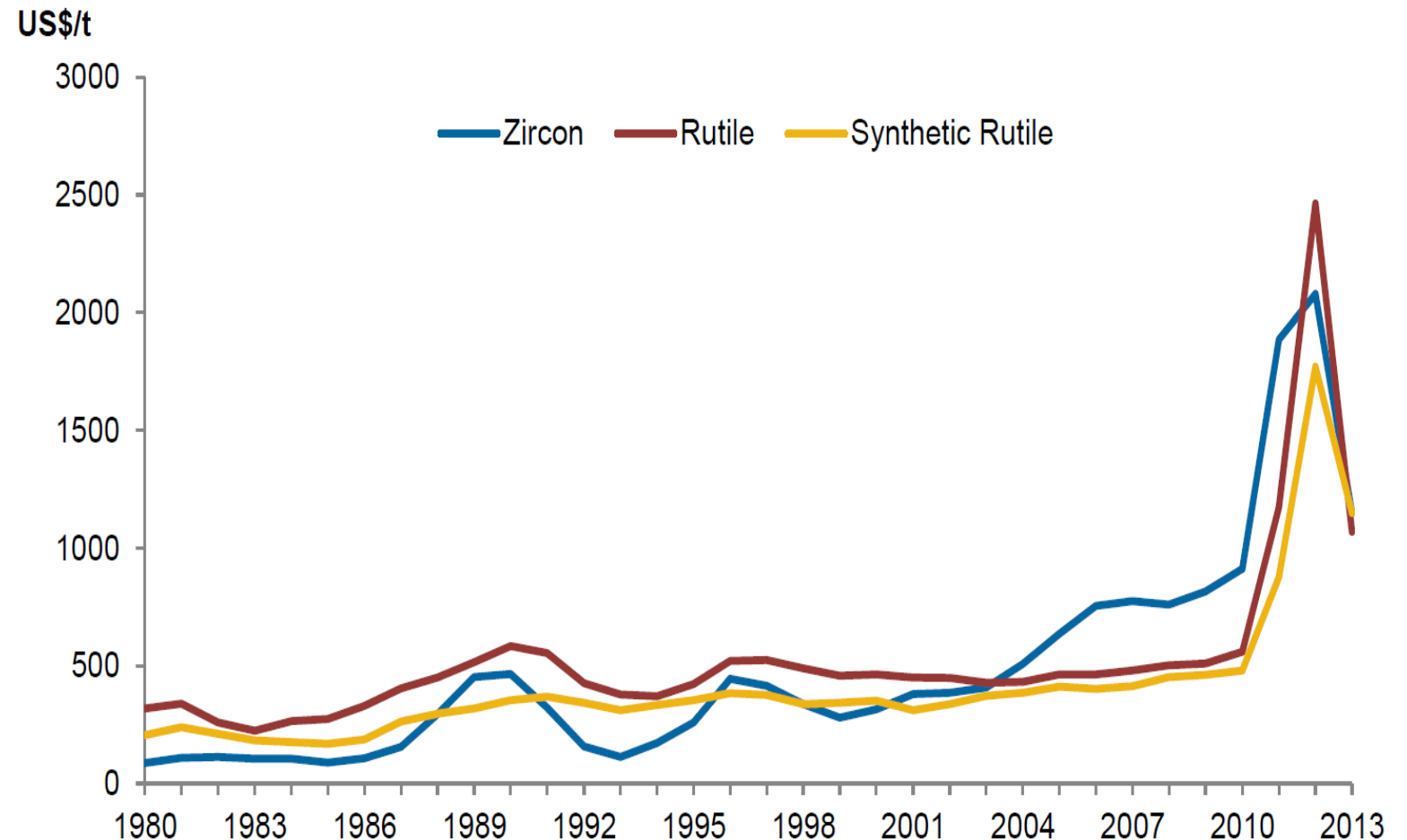
Sources: TZMI

Medium term prices - driven by increasing urbanisation

During 2010-2012 mineral sand product prices rose from values typically less than US\$600/t to over US\$1,500.

Since 2012 prices have settled to about US\$1,000/t.

The medium term fundamentals for zircon and high-grade TiO₂ products are favourable and growing demand for mineral sands products will be driven by increasing urbanisation, consumption growth in developing economies and new applications.



Source: Iluka and TZMI

Planned HMS work programme

- ❑ Assessment of known deposits to determine likely production parameters provided by new technology advances for fine grained HMS.
- ❑ Focus on well located small (25-50Mt) high-grade deposits.
- ❑ Low cost drilling – no need for geophysics or greenfield exploration.
 - Currently undertaking an evaluation of previous exploration/drilling data
 - Determine highest priority HMS drill intersections for follow-up
 - Drill sampling to:
 - firm resources of selected targets (tonnage, overburden, grade)
 - Provide sample for test work to determine HMS content, grain size and recovery
 - Use recent separation technology to study viability of processing

Corporate snapshot

Main office: Sydney, Level 14, 52 Phillip Street
Public capital raising of \$A4.5m
Commenced Trading 17 Feb 2011

ASX Code: **BPL**

Current cash: AUD0.2m

Share price, August 2014: 4.5-5.0 cents

Directors/Management

Creagh O'Connor (Chairman)
Dr Ian Pringle (MD)
Matt Hill
Rob Barnes

Corp Advisor
Geologist
Finance
Geologist

Francesco Giroto
John Elliot
Wolf Leyh
Ralph Stagg
Geoff Hill

Company secretary
Consultant Geologist
Consultant Geologist
Resources Consultant
Corporate/Finance

Capital

Shares	88,359,660
Options; Unlisted (20c, 17/2/16)	38,650,000

21/08/14

EMA (25)

BPL Weekly



Shareholders

Shares (m)

%

So Co Limited

34.37

39%

New Talisman Gold Mines Ltd
(previously Heritage Gold NZ Ltd)

17.93

20%

Top 20

63.65

77%

Total shareholders: 536

Broken Hill
PROSPECTING

Thank You

Ian Pringle, Managing Director, Broken Hill Prospecting Ltd

Tel: **0408 548 767**

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