

Importance of New Technologies in Mining Developments within Australia

Wayne Robertson
Theme Business Development Manager
Minerals Down Under Flagship

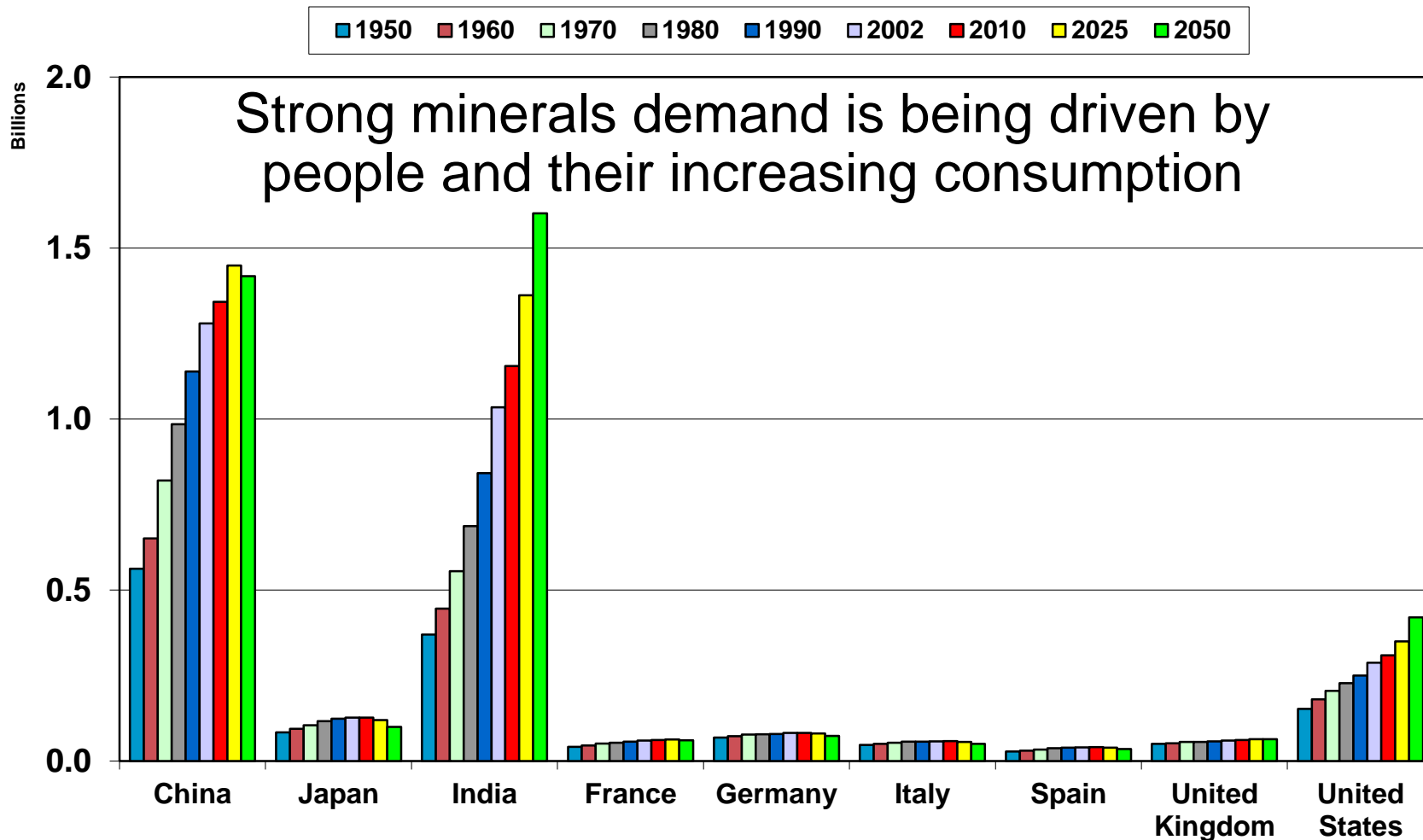
National Research
FLAGSHIPS
Minerals Down Under



The Australian Mining Industry

- The mining industry plays a crucial role in the Australian economy.
- Mining represented 8% of Australia's GDP in 2009-2010 with combined energy and minerals exports of \$169B
- This accounts for around 56% Australia's exports.
- Over the past 20 years the industry has contributed A\$500 billion to Australia's wealth
- Modern mining booms have been much less labour intensive than in the late 1960's – but the 'boom' has resulted in employment growing by 65% since 2002.

Biggest Driver: Growing world population



Source: U.S. Census Bureau - Population Division, International Programs Center, International Data Base

Biggest Driver: Growing world population

...over half our population, 3.3 billion people, will be living in urban areas



Shenzhen 1982 a small rural village

Source: UNFPA State of the World Population 2007. Unleashing the Potential of Urban Growth

Biggest Driver: Growing world population

...this is expected to swell to almost 5 billion.



Shenzhen 2007 a city of 7 million people

Source: UNFPA State of the World Population 2007. Unleashing the Potential of Urban Growth

Biggest Driver: Growing world population

81% of people in developing nations will completely depend on urban infrastructure for food, water, air...

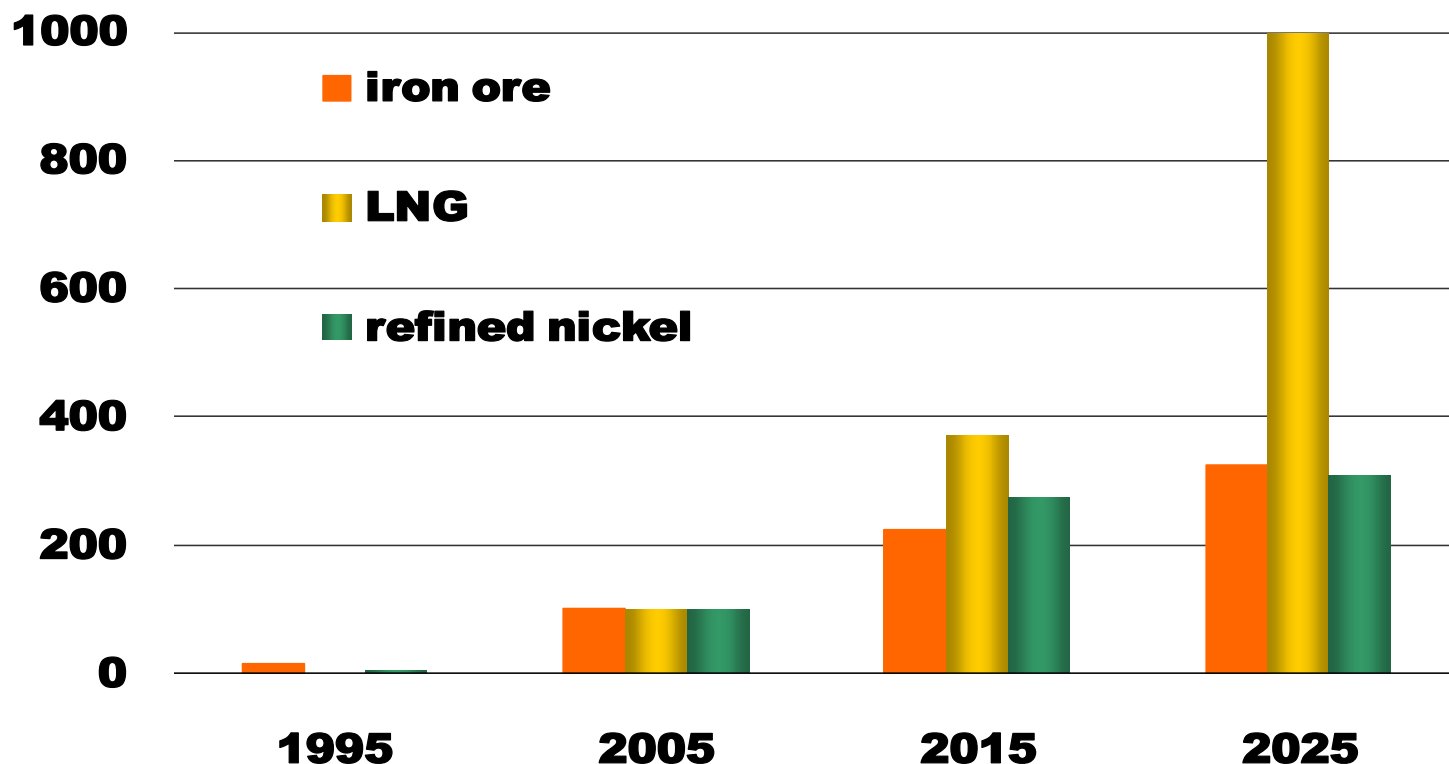


...and to remove their waste and provide their livelihood.

What GFC?

China's ongoing demands for minerals

Strong demand growth for metals and energy-“Supercycle”



Metal demand increasing – China's import requirements

Australian Minerals Sector – Research and Technology

1. What's driving the minerals sector in Australia today?
2. What are the consequential technology challenges it presents?
3. How is CSIRO structuring its research effort to assist the mining industry to help shape a sustainable and socially responsible industry by providing knowledge innovation and technology

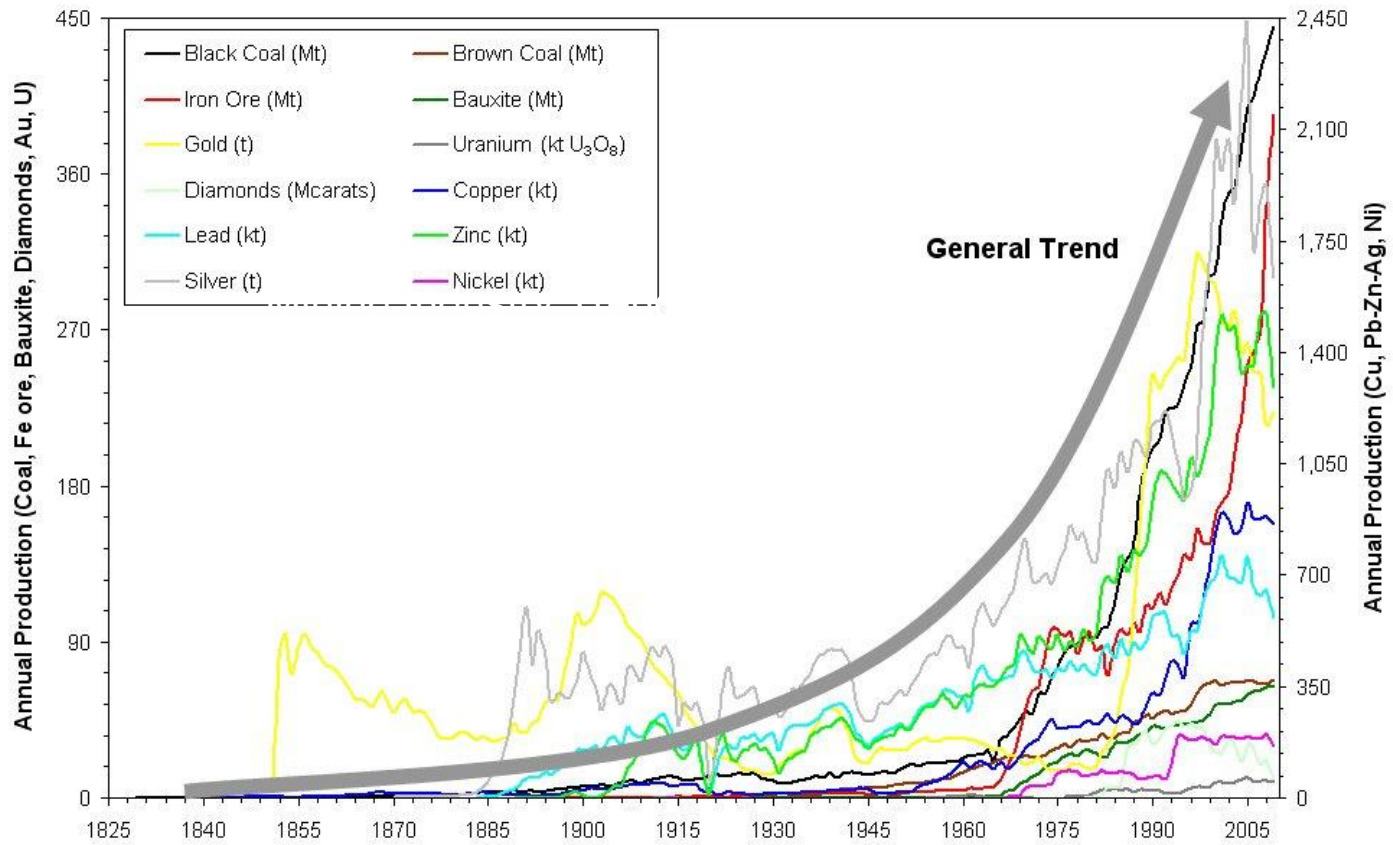


Drivers of the Minerals Industry



Industry driver ...increasing production

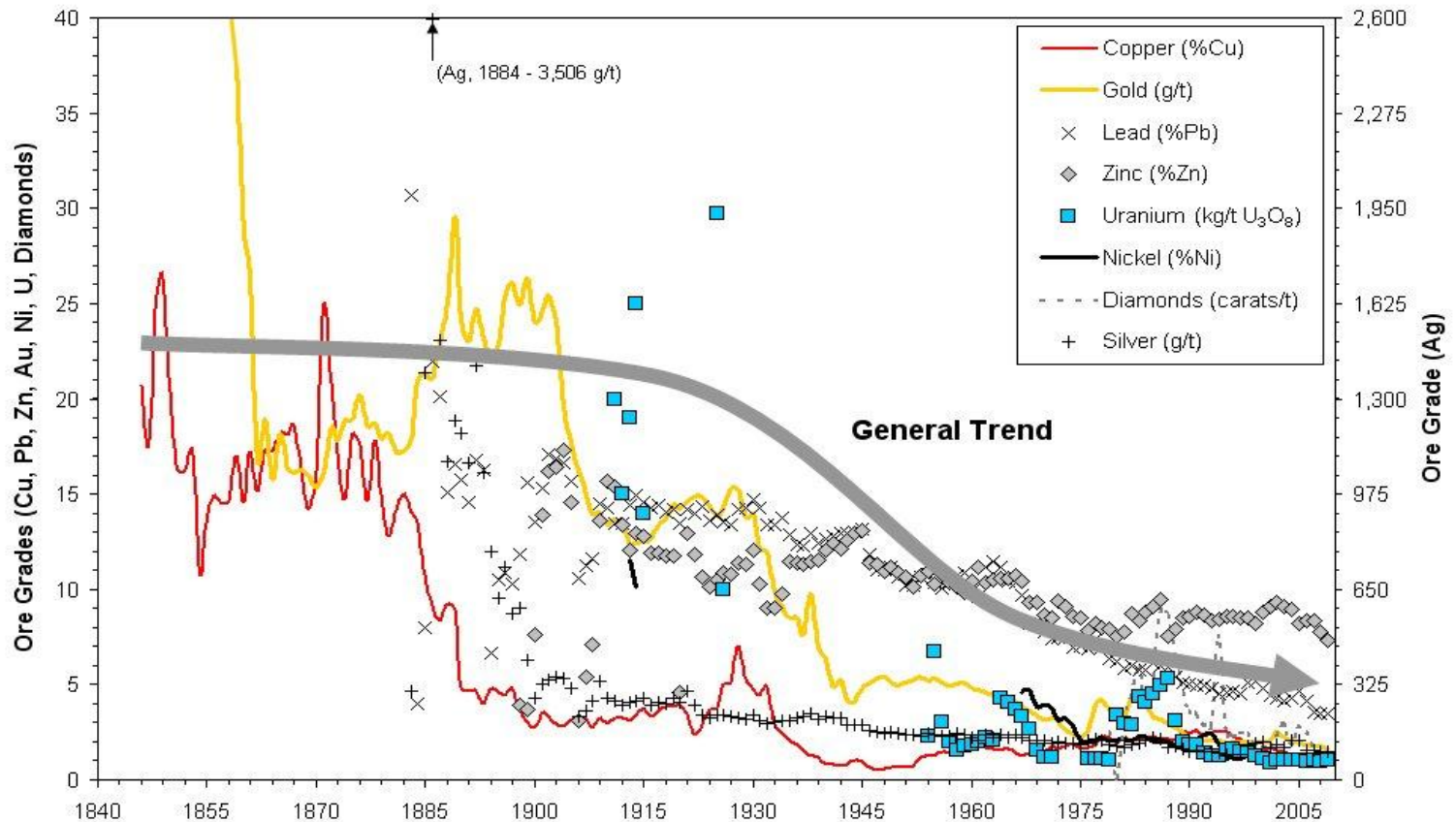
Mining industry characterised by increasing production



Mudd, GM, 2009. The Sustainability of Mining in Australia: Key Production Trends and Their Environmental Implications for the Future. Department of Civil Engineering, Monash University and Mineral Policy Institute.

Industry driver ...more from less

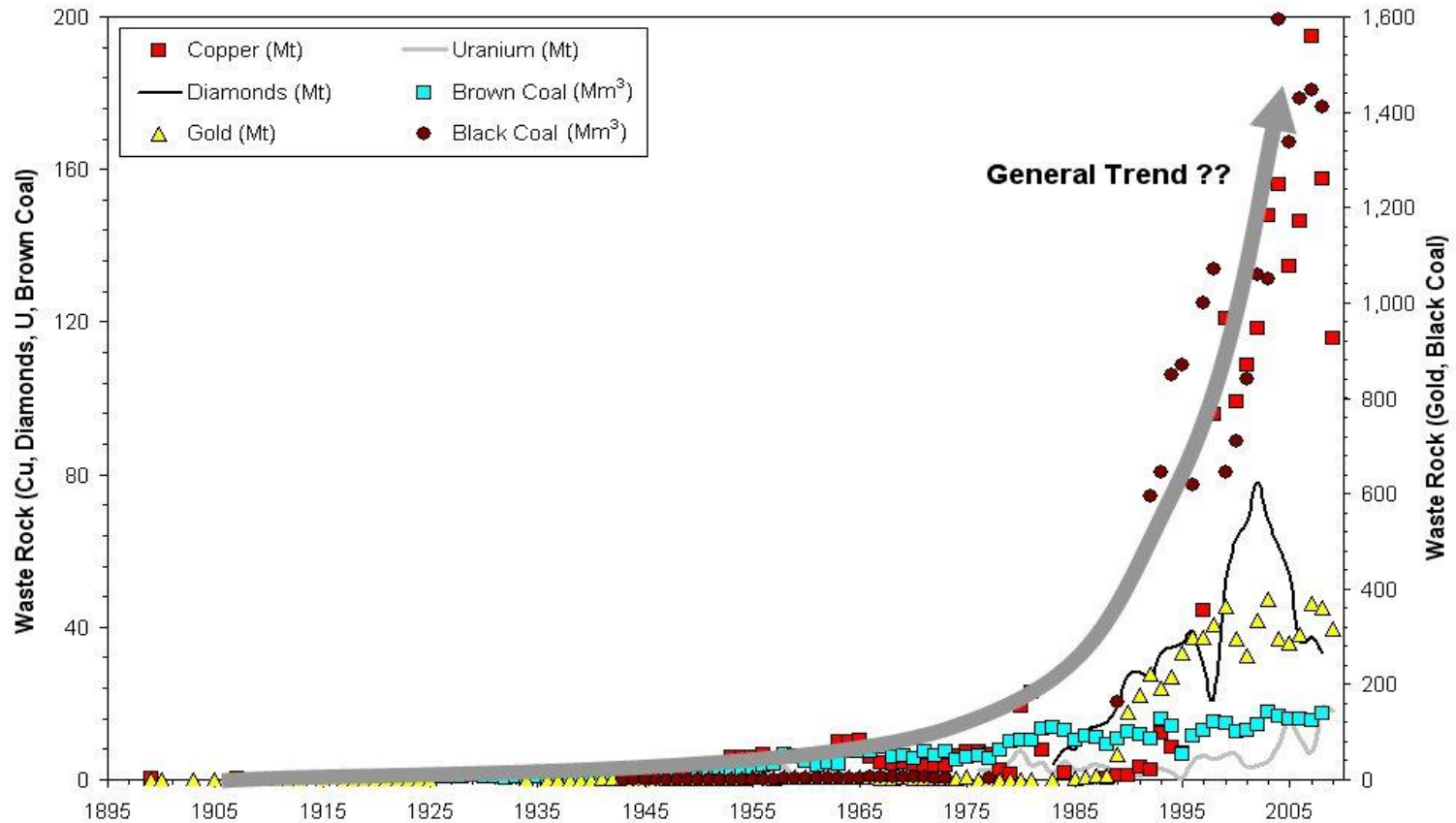
Ore grades declining, unlikely to ever increase in the future



Mudd, GM, 2009. The Sustainability of Mining in Australia: Key Production Trends and Their Environmental Implications for the Future. Department of Civil Engineering, Monash University and Mineral Policy Institute.

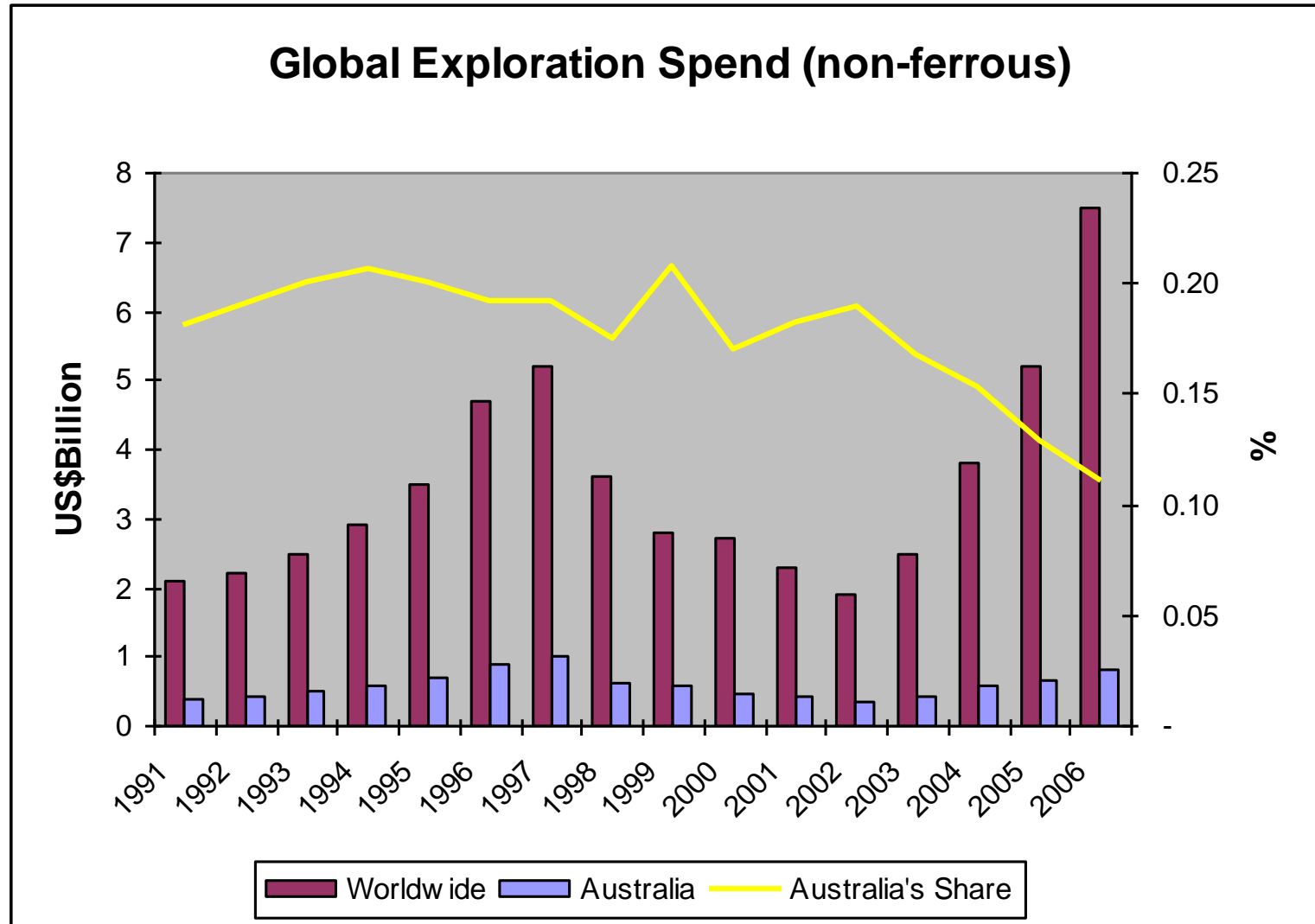
Industry driver ...Resource depletion rates

Capacity expansion is accelerating production and rate of depletion



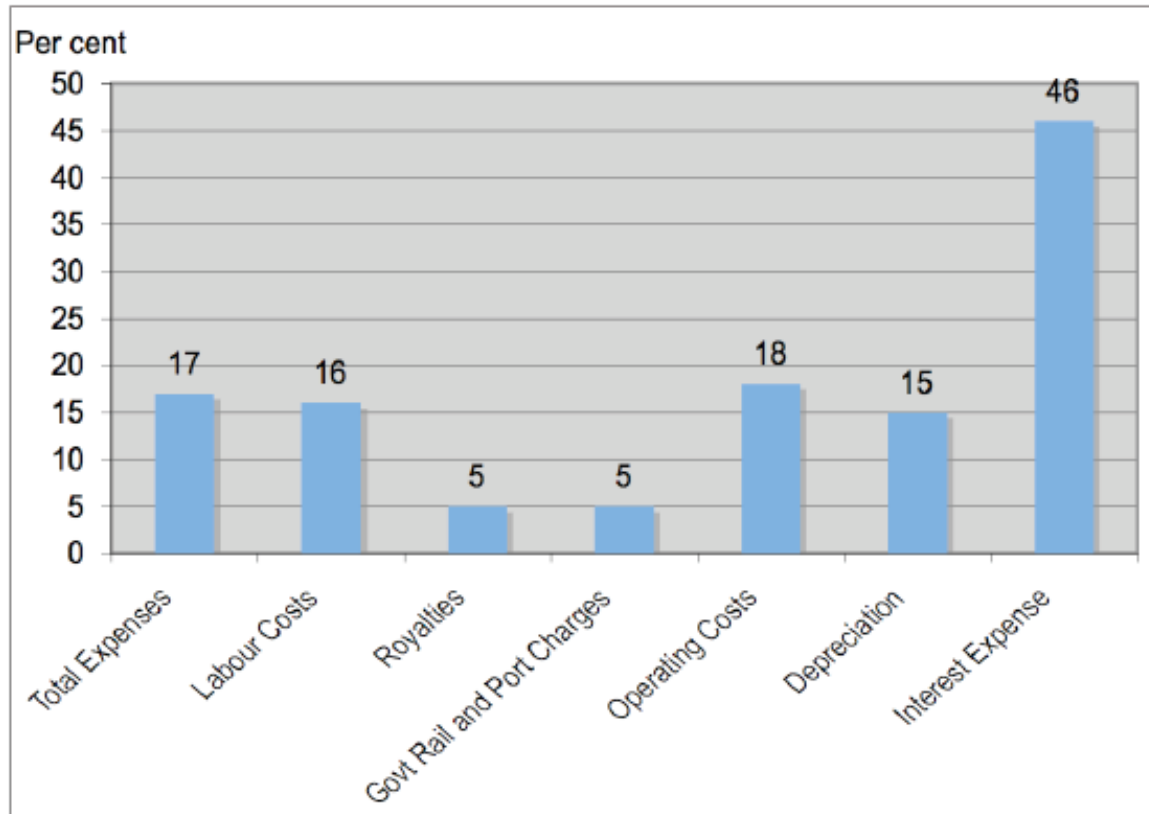
Mudd, GM, 2009. The Sustainability of Mining in Australia: Key Production Trends and Their Environmental Implications for the Future. Department of Civil Engineering, Monash University and Mineral Policy Institute.

Industry driver ...Declining expenditure



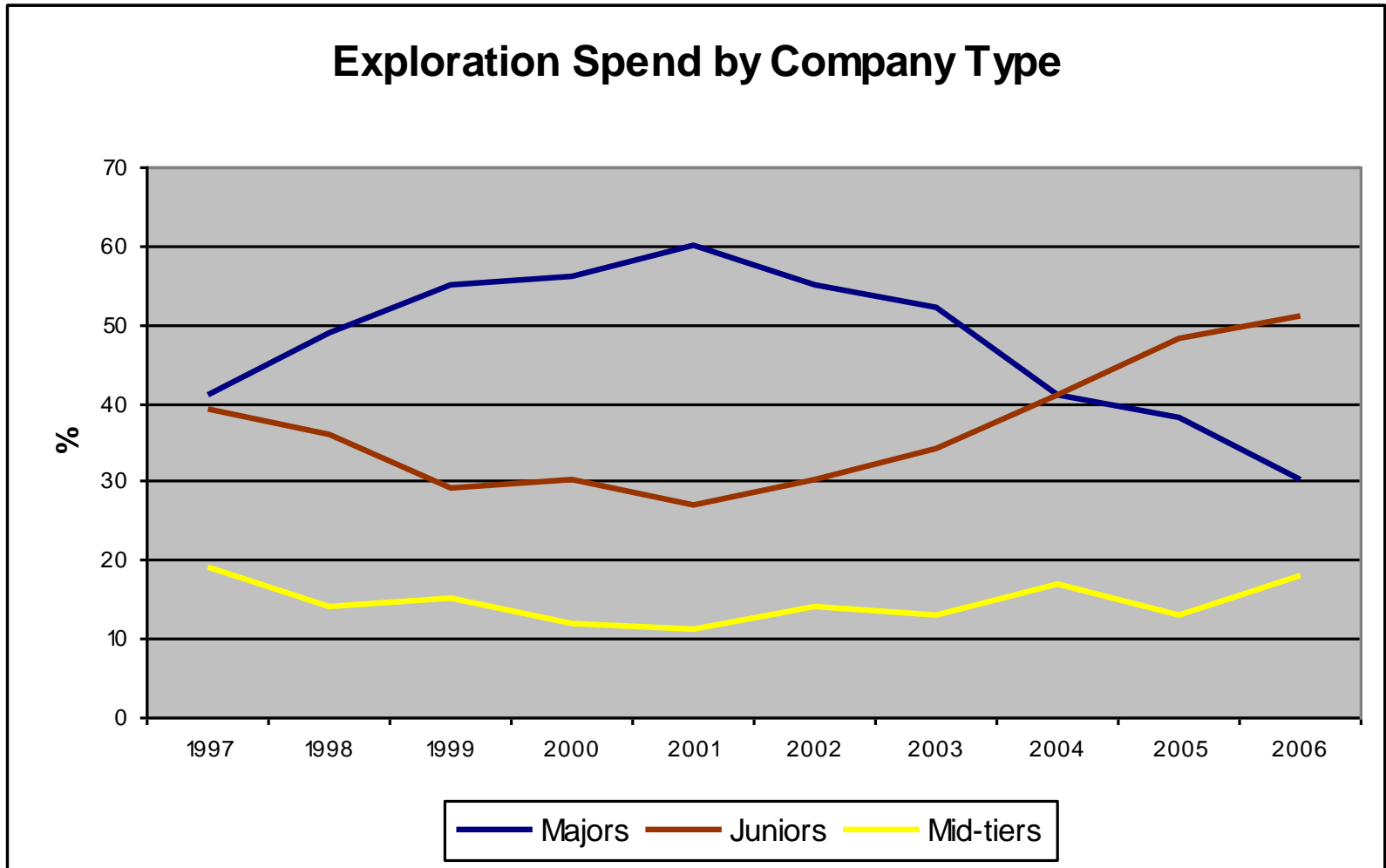
Industry driver ...Increasing production costs

Chart 1.5: Percentage Increase in Expenses 2005-06 and 2006-07

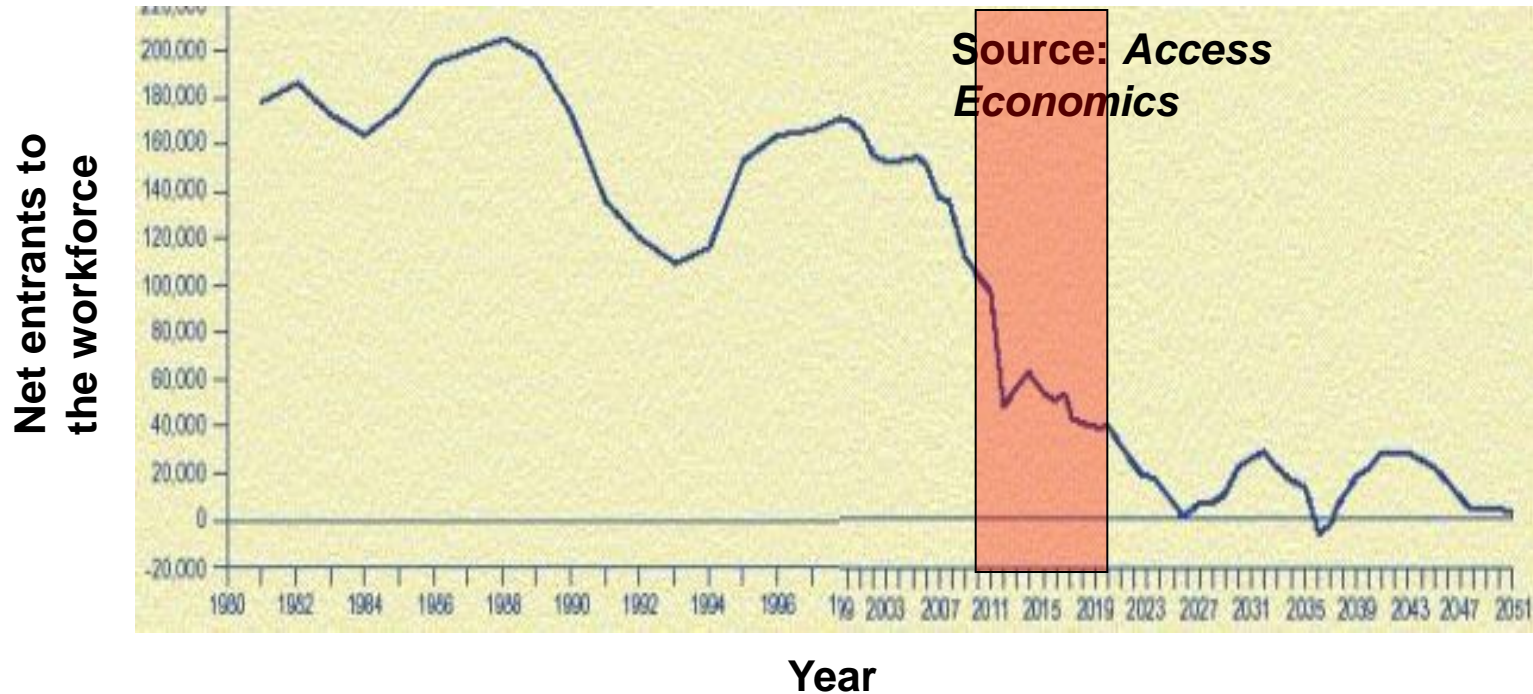


Source: Minerals Council of Australia, 2007 Minerals Industry Survey Report

Industry driver ...Who does exploration?



Industry driver ...skilled labour shortage

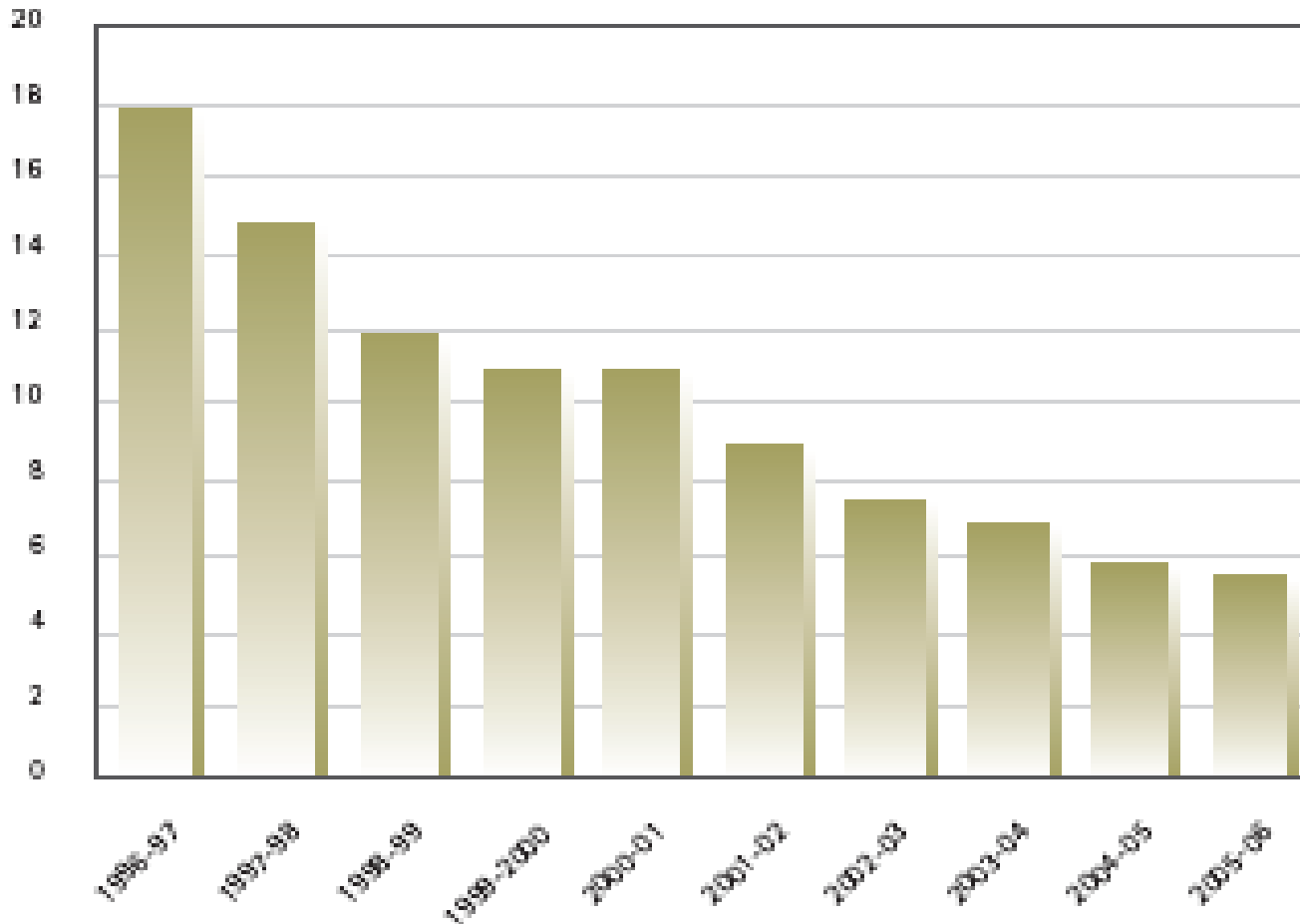


Between 2005 and 2015 the workforce will need to increase by 50% (70,000 people) to sustain the sector (MCA 2007-08 pre-budget submission, December 2006)

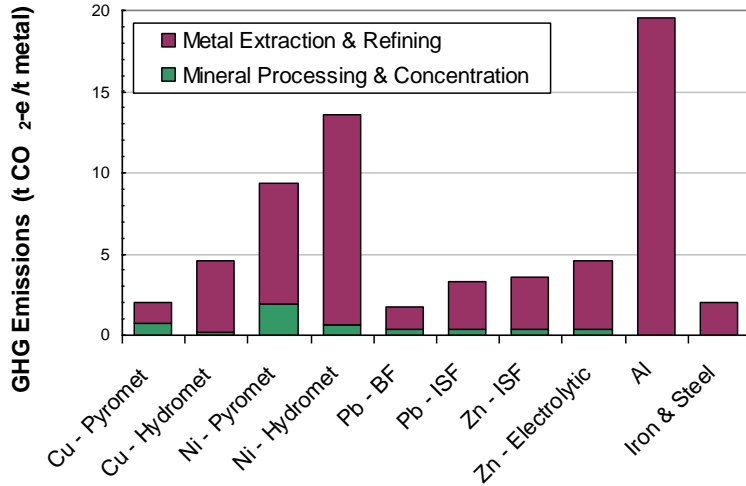
Job vacancies in the minerals sector have grown five-fold since 2002 (MCA 2008-09 pre-budget submission, January 2008)

Industry driver ...Health and safety priorities

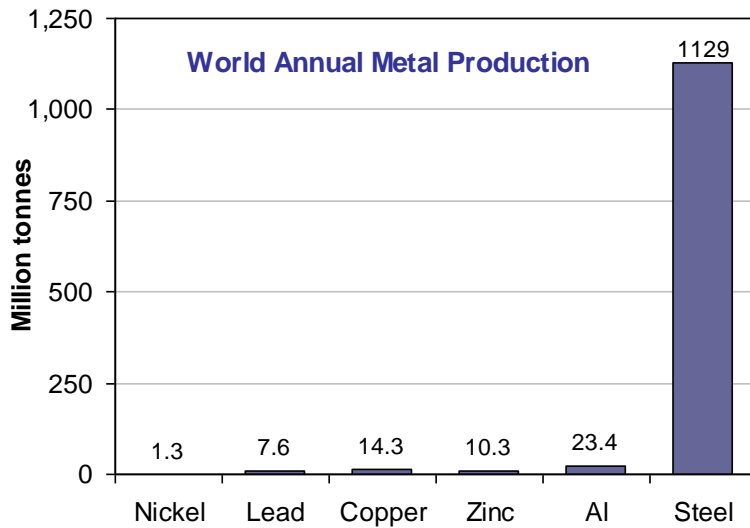
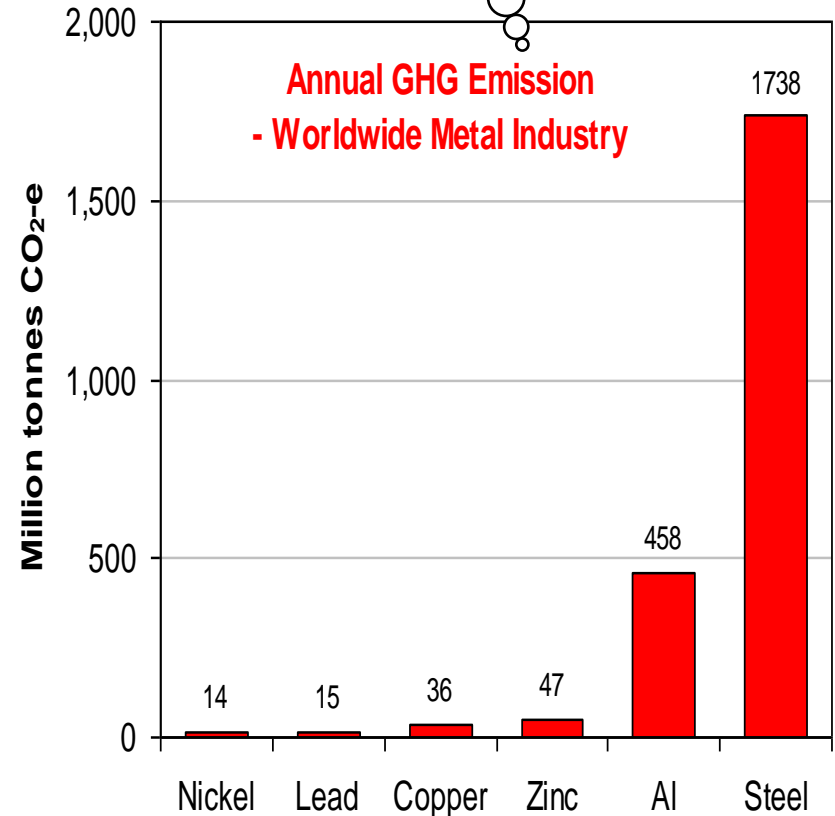
Chart 6 Lost time injury frequency rate 1996-97 to 2005-06



Industry driver ...Social & environmental influences



~ 2.2 billion tonnes of CO₂-e per annum!



The good news is.....but!

The good news is: ...sustained demand for mineral commodities.

So what are the consequential challenges for technology it presents ?

- Australian ore bodies need to be discovered – new exploration techniques
- Juniors will do more of the high risk “greenfields” exploration – they will need simple affordable tools and processes to help them
- Quality reserves are declining rapidly – improved processing and extraction technologies will be required to secure sectors of the industry and allow it to continue to create wealth for Australia
- Demography says that the workforce will have to produce more per capita – a highly trained workforce helping to drive automation technology and help transform productivity
- Mining will be taking place in more difficult conditions - need technologies for transforming the future mine
- Health, safety and environmental outcomes must continue to improve – need technologies that create less GHG, lower water use and zero waste

Technology can be many things

Perfume



**“I want my husband to pay more attention to me.
Got any perfume that smells like a computer?”**

Technology – Expectations and Impacts

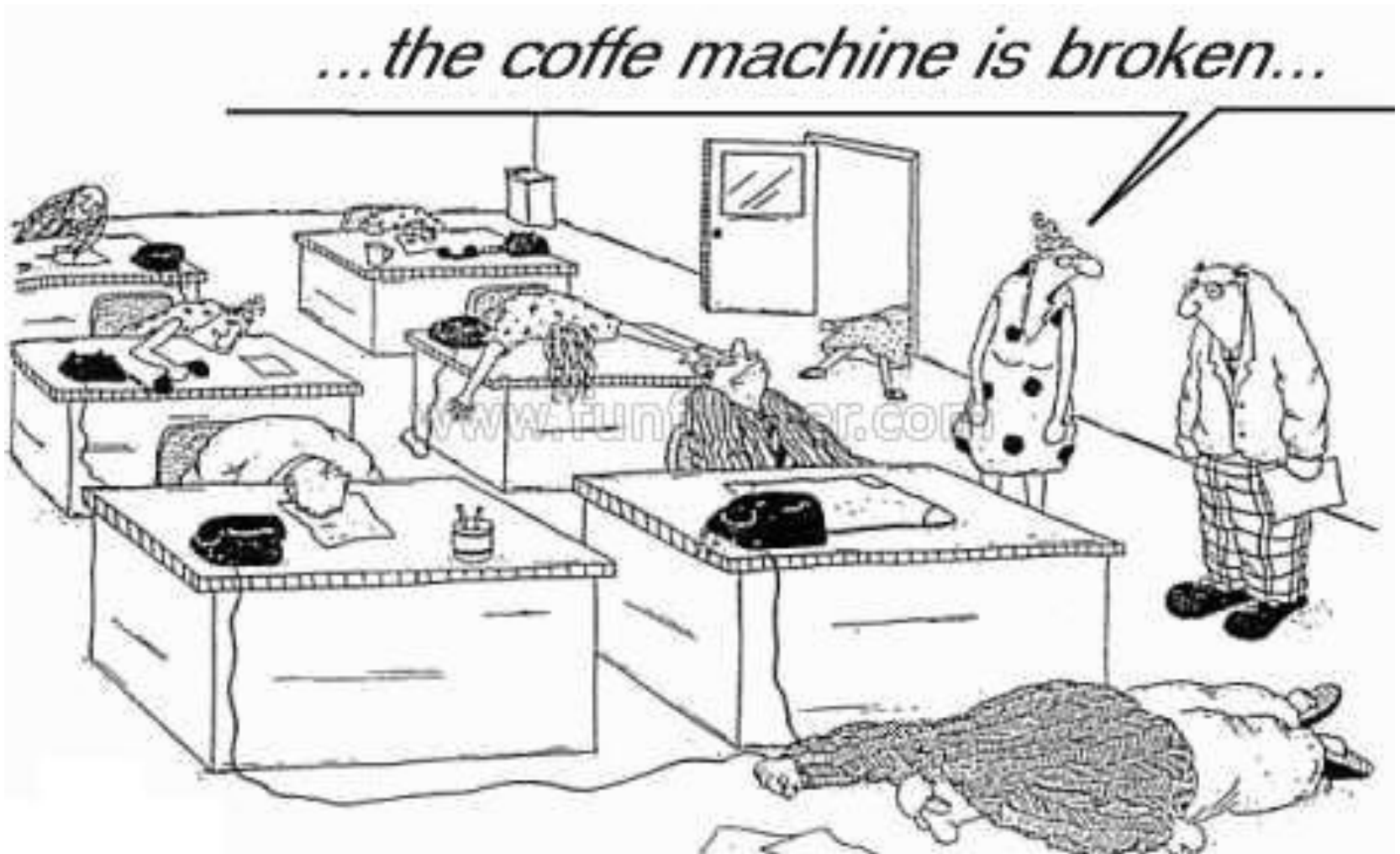


"SORRY, WE CAN'T E-MAIL YOUR PIZZA AS ATTACHMENT."



I AM REALLY GETTING WORRIED ABOUT THE INCREASING USE OF CREDIT CARDS...

Technology – it used to be simple!



Technology Impact

The development of 3D seismic & deep drilling

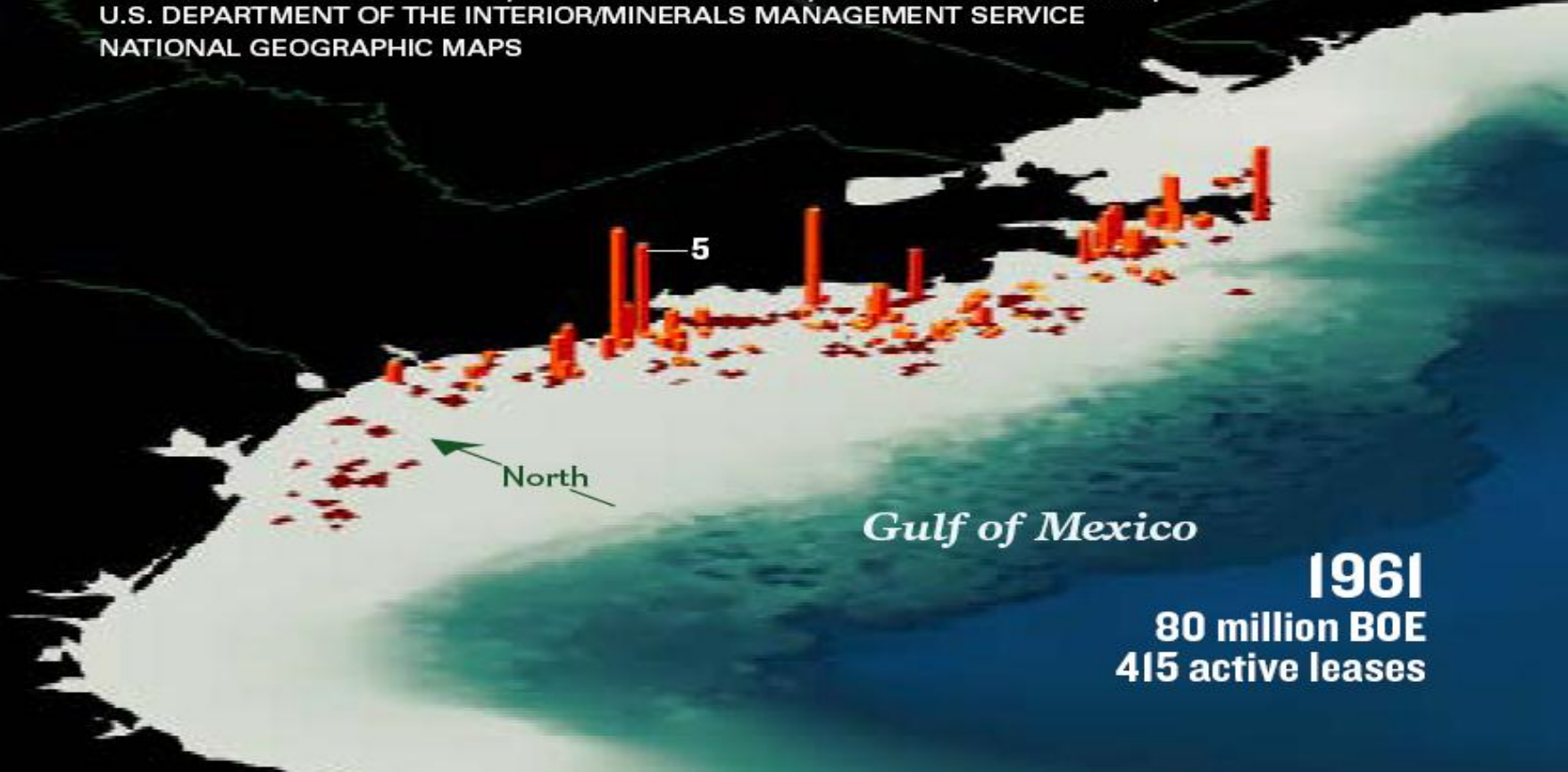
5

Barrels of oil equivalent (BOE) in millions, includes natural gas

Active lease

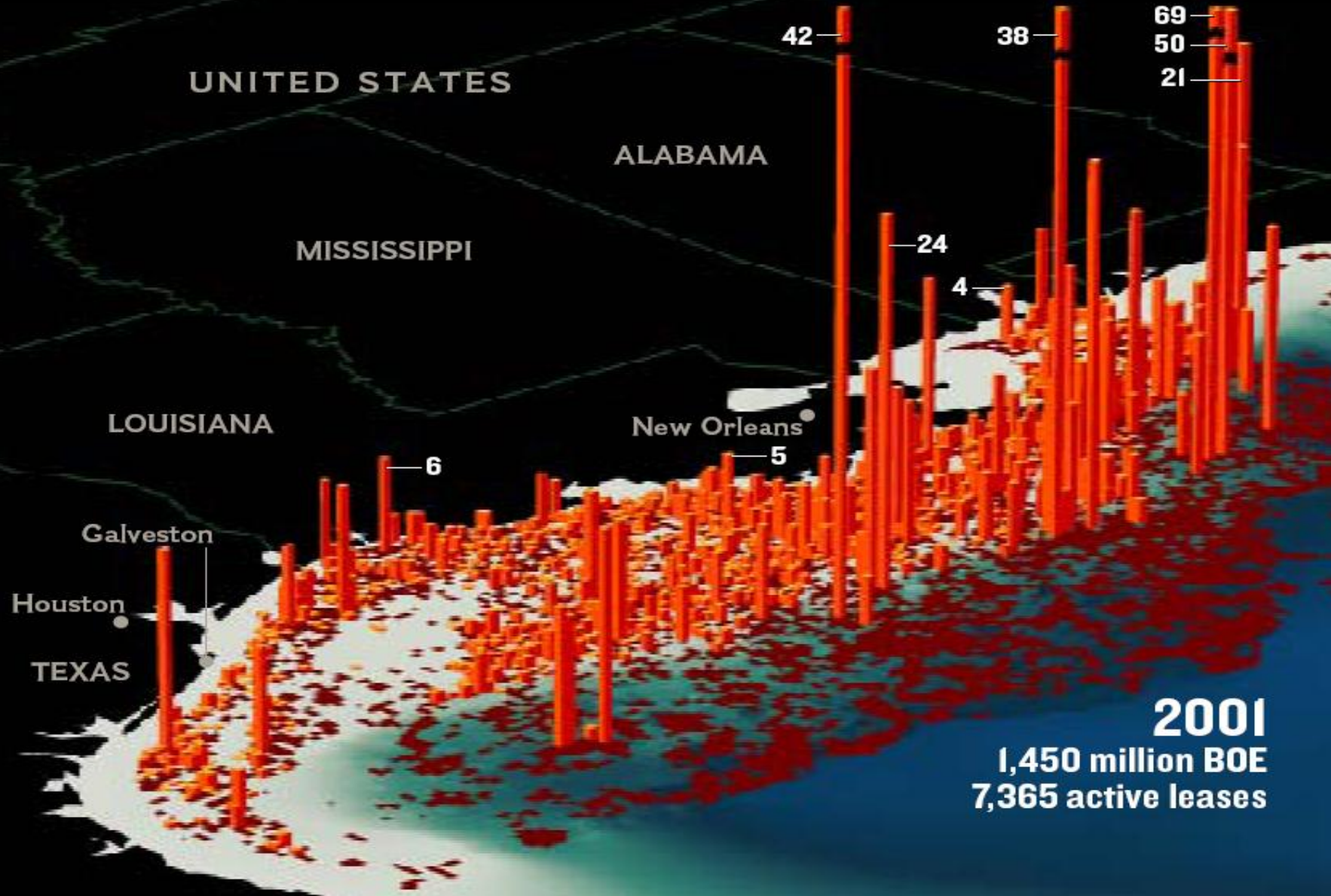
Scale varies in this perspective. Distance from Houston to New Orleans is 316 miles (509 kilometers).

SOURCE: NORMAN FROOMER, TARA MONTGOMERY, AND JAMES F. BENNETT,
U.S. DEPARTMENT OF THE INTERIOR/MINERALS MANAGEMENT SERVICE
NATIONAL GEOGRAPHIC MAPS



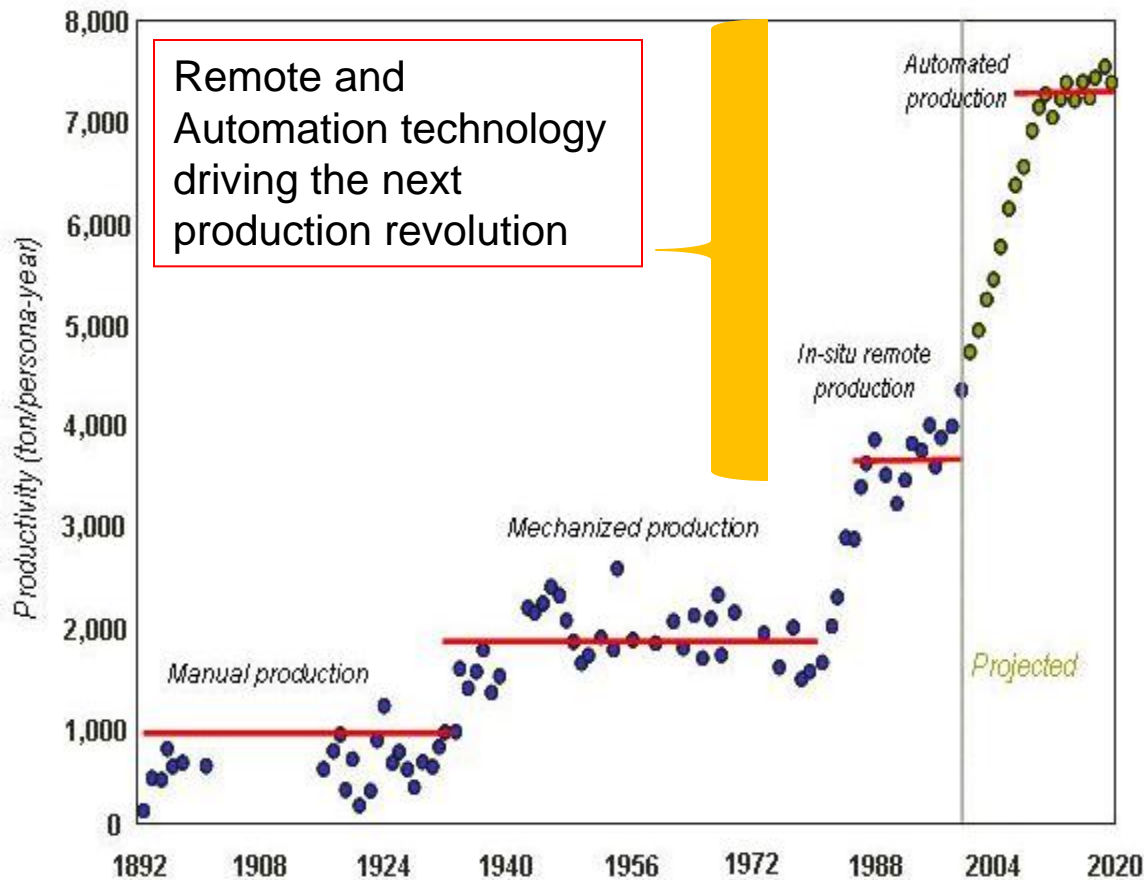
Technology Impact

The development of 3D seismic & deep drilling

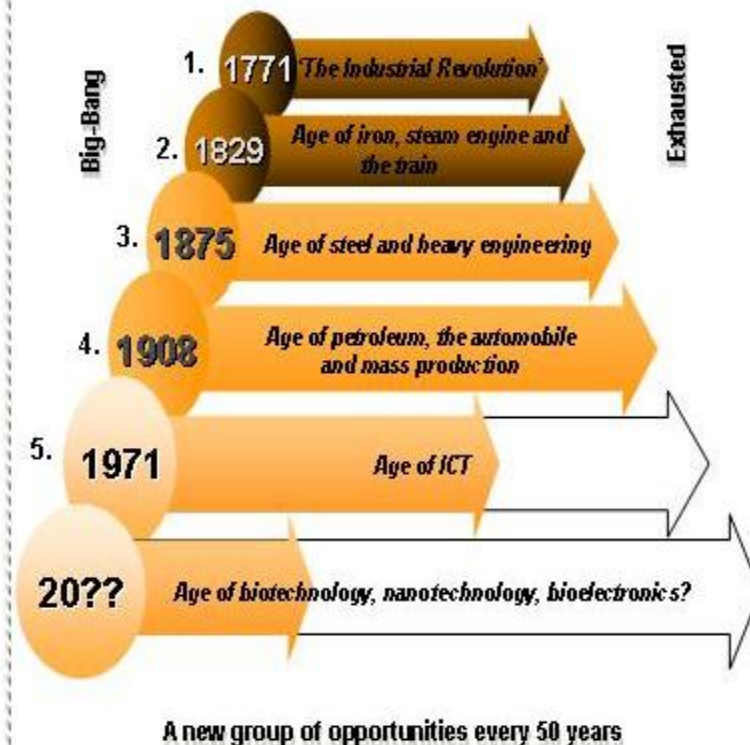


Technology impacts on Production

Past Productivity and Anticipated Productivity from Technology Change from One Company

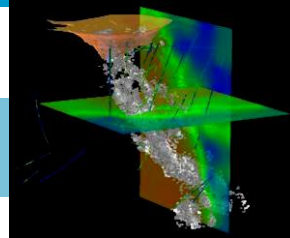


Five technological revolutions in 230 years



CSIRO – Global Leader in Mining Research and Technology Development

Australia's premier science agency



One of the largest and most diverse R&D Groups in the world

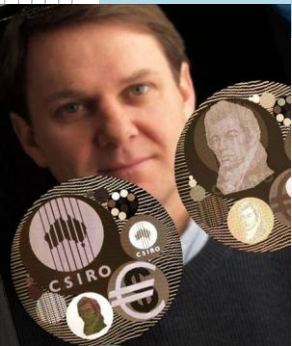
Ranked in top 1% in the world in 14 research fields



About 6 000 staff, over 2 000 PhD's

>20 spinoff companies in the last 6 years, 2008-09 ~\$300M in IP revenue

Thousands of companies utilise CSIRO innovation



National Research
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Minerals Down Under



CSIRO – “Doing the Big Things that Matter”

Water, Energy, Mining, Climate, Oceans, Environment....



Geochemical surveying



Waste water management



Teleoperated rockbreaker



Teleoperated shiploader



•RV Franklin Australia



Exploration visualisation



Data interoperability



Spectral core logging



Geophysics



Dry granulation



Biomass



Remote control room



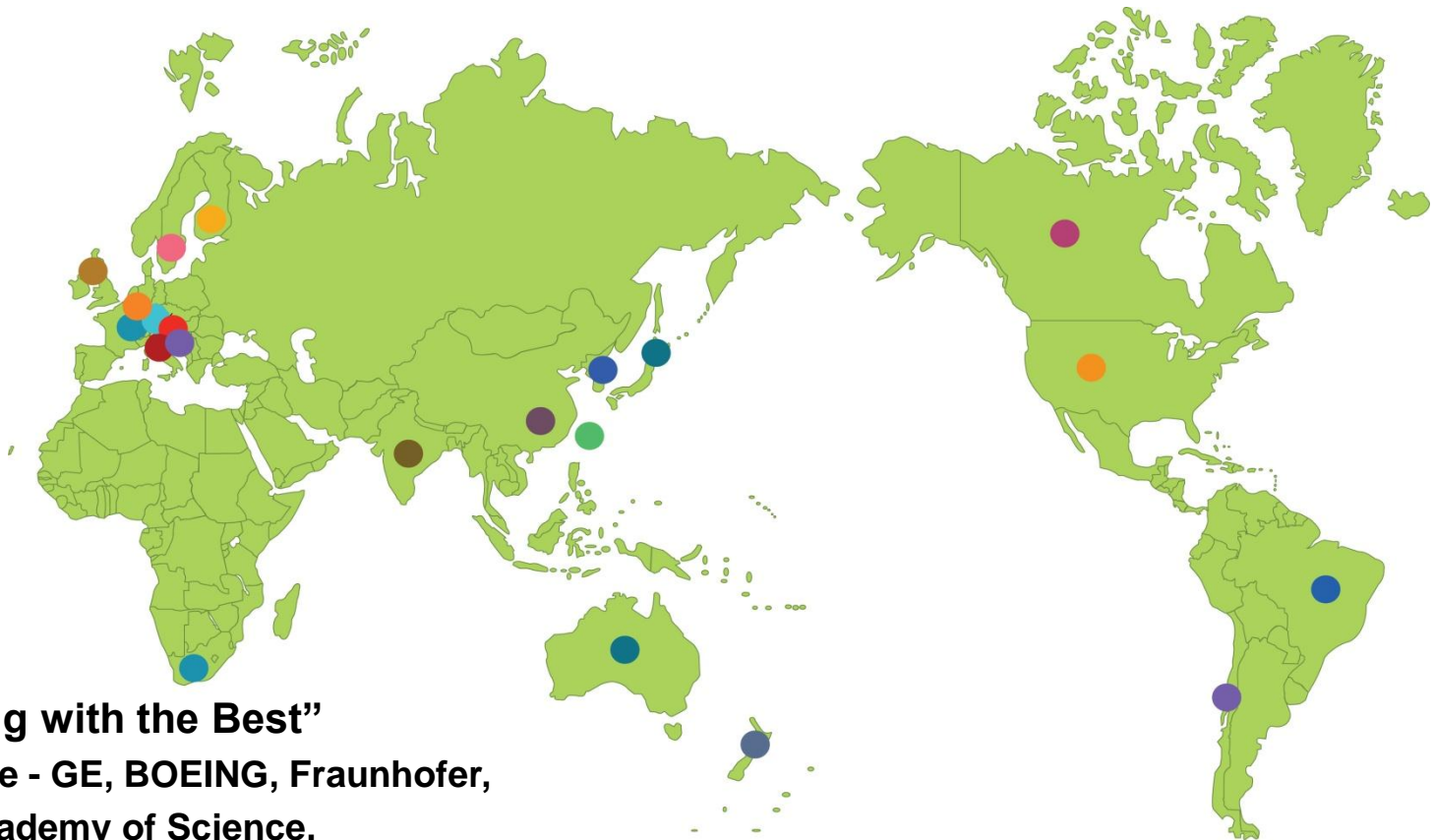
•Geomechanics



•Synchrotron

CSIRO – International partners

1000 activities – 70 Countries



- **“Partnering with the Best”**
- **For Example - GE, BOEING, Fraunhofer,**
- **Chinese Academy of Science,**
- **NASA, JnJ, Monsanto, AMIRA, ORICA**
- **Singareni, JCOAL, BHPB, Newcrest**
- **EADS, GRA, EMBRAPA, DOE, UCH.....**

...and a long standing track record of delivering strategic R&D outcomes



- Wireless LAN technology in over a billion devices
- 99% of all Australian export cotton, 34% of US market
- Orica bio-remediation product - 40% US market share
- Reditus options software used by 900 banks globally
- Polymer banknotes used in 18 countries
- Lowering production costs for Boeing 737 & 777
- The house of the future for Telstra and Lend Lease
- A low emissions Commodore for Holden

•R&D alliances



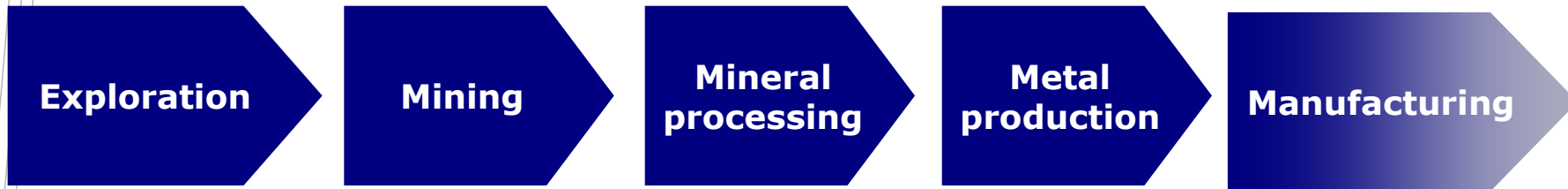
CSIRO in the mineral resources sector

CSIRO's effort in the mineral resources domain:

- involves about 500 scientists and engineers at fourteen sites located in five states and the NT;
- includes collaboration with 52 universities and other institutions, both nationally and internationally;
- engages with scores of companies across the value chain; and
- is based on a technology vision for where the sector is going.



CSIRO portfolios in the minerals value chain



The **Minerals Down Under Flagship** delivers to the value chain in a range of strategic mineral commodities

The **Light Metals Flagship** delivers to the alumina, aluminium, titanium and magnesium value chain

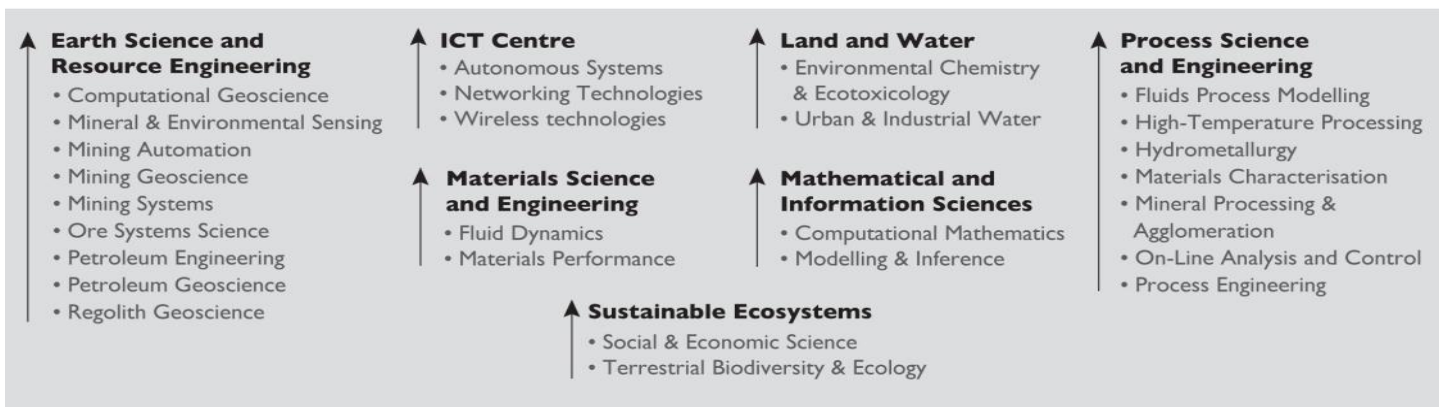
Contributing Divisions: Earth Science & Resource Engineering; Process Science and Engineering; Materials Science & Engineering; ICT Centre; Mathematical & Information Sciences; Land & Water; Marine & Atmospheric Research; Sustainable Ecosystems

Minerals Down Under in the context of R&D and technology development



Minerals Down Under National Research Flagship

Assisting the minerals industry to exploit new resources with an *in situ* value of \$1 trillion by 2030. More than doubling the size of the associated services and technology sector by 2015.



Developments in Technology



CSIRO

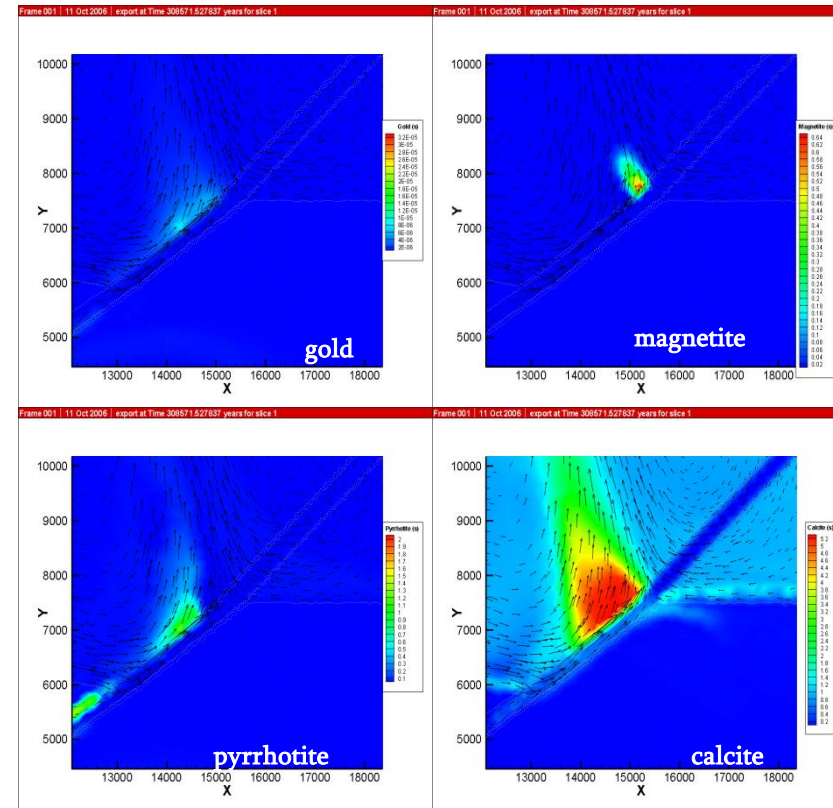
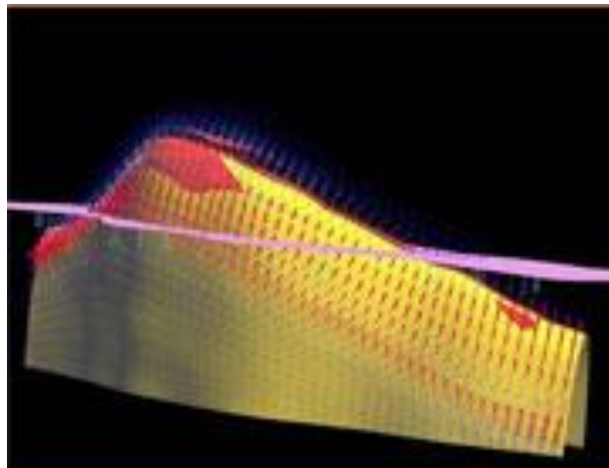


Technologies for discovering Australia's mineral resources

The Predictive Discovery System is a solution to mineral exploration targeting issues

A world-class combination of knowledge, data, technology, know-how software and skilled personnel providing solutions for a wide range of hydrothermal ore environments

These type of technology developments are about providing tools that can be transferred to the mining services sector



Technologies for discovering Australia's mineral resources

- BIO-INDICATORS are being used to develop exploration knowledge and subsequent techniques for locating mineralisation under cover
- Nature is lending a hand in the exploration of minerals with termites, trees and kangaroo poo becoming useful indicators of what lies hidden beneath the ground, without the need for expensive and sometimes environmentally damaging drilling
- These are newly applied exploration techniques being applied in an Australian context to increase targeting success



Technologies for discovering Australia's mineral resources

Hylogging™ systems

- Rapid non-destructive mineralogical characterisation of cores & chips.
- Developed for mine and exploration-based activities for efficient and objective mineralogical analysis (e.g. vastly improved, rapid resource delineation and grade control)
- Specialist Hardware and Software systems: Hylogger™; HyChips™; TSG software suite
- In discussions with potential commercial partner(s).



Developed in collaboration with the Australian industry, the State Geological Surveys and Geoscience Australia.

Technologies for discovering Australia's mineral resources

AuScope Portal - Mozilla Firefox
http://portal.auscope.org/gmap.html

Home Map Login

AuScope
AN ORGANISATION FOR A NATIONAL EARTH SCIENCE INFRASTRUCTURE PROGRAM

Themes

- Web Map Service Layers
 - WA Center of Excellence for 3D Mineral Mapping
 - GSV
 - GSWA
 - Borehole
 - WVCL Borehole WFS
 - Global Navigation Satellite Systems
 - Geodesy
 - Geodesy GPS WFS
 - Geologic Unit
 - Mineral Occurrences
 - Mining Activity
 - PRSA Mineral Occurrence WFS
 - GSV Mineral Occurrences WFS
 - Mines

Filter Properties

Mining Activity Filter Properties

Mine Name:

Produced Material Name: Gold

Mining Activity Start Date:

Mining Activity End Date:

Min. Ore Processed:

Grade:

Min. Production Amount:

Show Me >>

Download Datasets

Summary Mosaic Plot Scalars Plots

Zoom Map Satellite Hybrid Terrain Earth

Open in a new window

200 m
500 km

Imagery ©2009 TerraMetrics - Terms of Use

Now: Sunny, 24 °C
Fri: 25 °C
Sat: 24 °C

http://portal.auscope.org/restproxy?http://150.229.98.207/Display_Tray_Full.aspx?coreid=1008&trayid=863

Home Map Login

AuScope
AN ORGANISATION FOR A NATIONAL EARTH SCIENCE INFRASTRUCTURE PROGRAM

Themes

- Web Map Service Layers
 - WA Center of Excellence for 3D Mineral Mapping
 - GSV
 - GSWA
 - Borehole
 - WVCL Borehole WFS
 - Global Navigation Satellite Systems
 - Geodesy
 - Geodesy GPS WFS
 - Geologic Unit
 - Geologic Unit - Lithostratigraphy
 - AUS GA 1:2.5M Geologic Unit - Age
 - East AUS GA 1:1M Geologic Unit - Lithostratigraphy
 - East AUS GA 1:1M Geologic Unit - Age
 - East AUS GA 1:1M Contacts
 - East AUS GA 1:1M Faults

Filter Properties

Filter options will be shown here for special services.

Download Datasets

Map Satellite Hybrid

200 m
500 km

Imagery ©2009 TerraMetrics - Terms of Use

Now: Sunny, 24 °C
Fri: 25 °C
Sat: 24 °C

http://portal.auscope.org/restproxy?http://150.229.98.207/Display_Tray_Full.aspx?coreid=1008&trayid=863

Pre-competitive data access for mineral exploration companies
AuScope Grid - Surfing the Earth Model

Technologies for transforming the future mine

The Issue

- Sirovision[®] was developed to help prevent catastrophic collapse of walls in open cut mines.
- It needed to be able to survey difficult or unsafe areas from a distance.



Sirovision[®]

- digital stereographic automated positioning and mapping system for open cut and underground operations
- Technology enables improvements in structural measurement productivity of up to 500%.
- The payback period averages 24 days of use in the field.

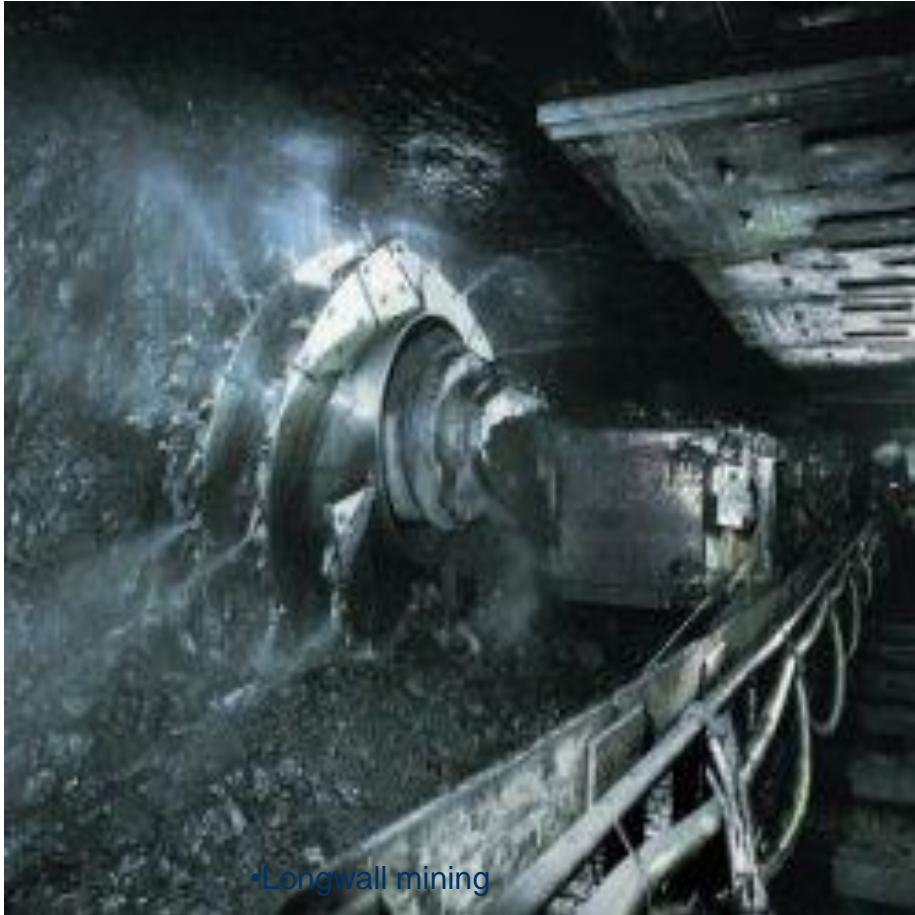
Technologies for transforming the future mine

MINEGEM™ Automated LHD technology

- Minegem™ uses a “relative” navigation system which is robust and is capable of driving in unmapped/unseen” areas if so configured
- Digital video sent back to control station using WiFi
- LHDs shown tracking on mine maps at operators’ console
- Commercialised through Caterpillar Underground



Technologies for transforming the future mine



Longwall automation

Issues

- Health and safety
- Longwall downtime

Technologies

- Remove workers from hazardous areas
- Keep face straight & on track
- Keep face in seam

Benefits

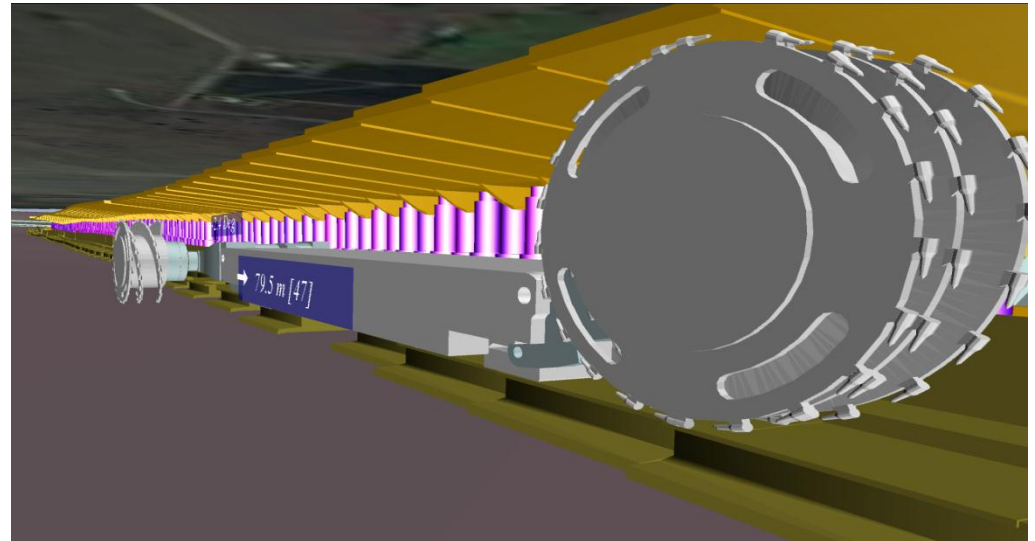
- Improve health & safety
- Productivity gains

LASC - Automation of Underground Long wall mining operations

World's best practice

- Internationally licensed to leading OEM's – *In Bye Mining, Joy Global Machinery, Bucyrus, Eichoff, ZZM Kopek*).
- *Technology automates* - Shearer Position, Face alignment, Horizon Control
- *Significant step change in safety, production and efficiency*
- *Between 5- 10% productivity improvements*

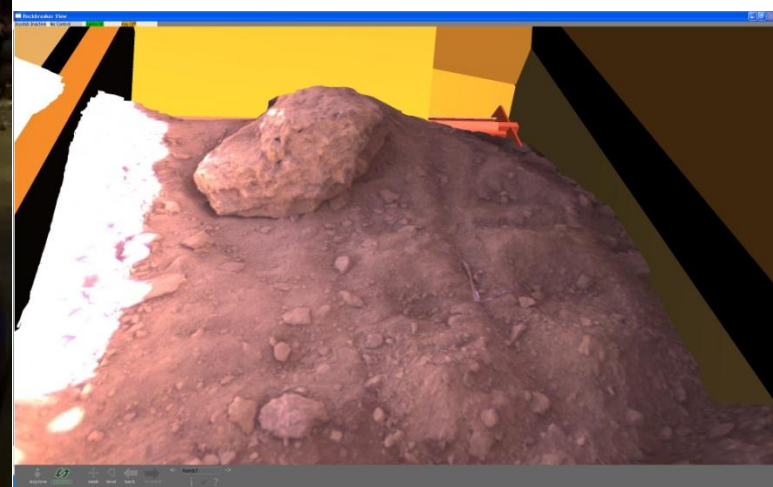
The automation system lowers the need for miners to have to stop periodically to manually realign the longwall face and shearer.



Technologies for transforming the future mine

Automation

- The remote tele-operation of a rock breaker at a Western Australian mine site has now been demonstrated.



Technologies for transforming the future mine

6 video cameras

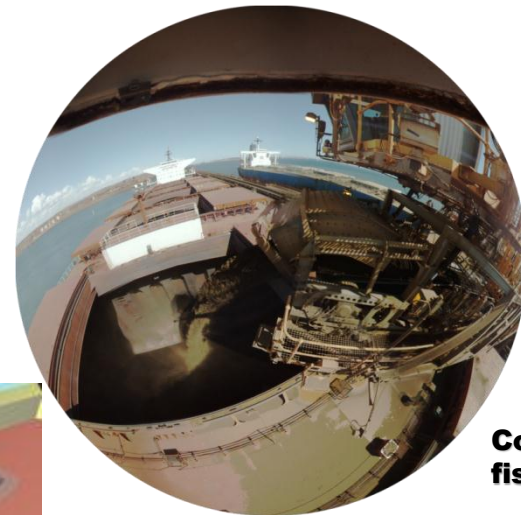


LadyBug3™
360° spherical
digital camera

6 CAMERA VIEWS



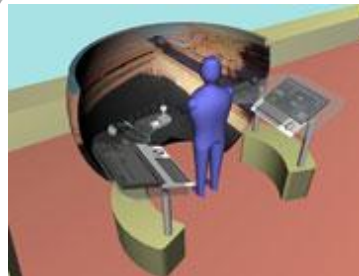
Convert to spherical
camera views



Convert to single
fisheye projection

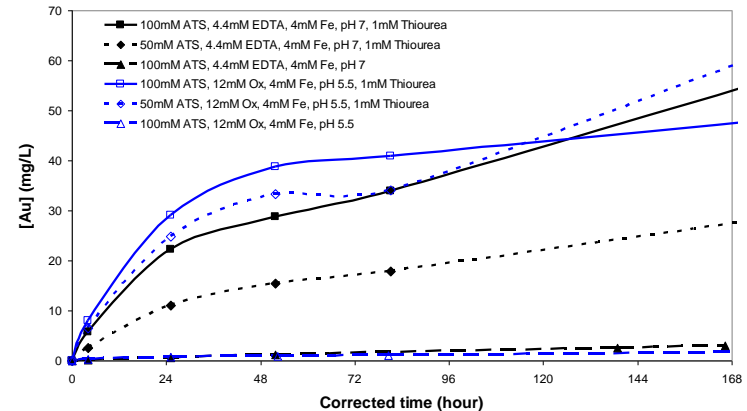


3 metre dome projection



Technologies for advancing mineral processing

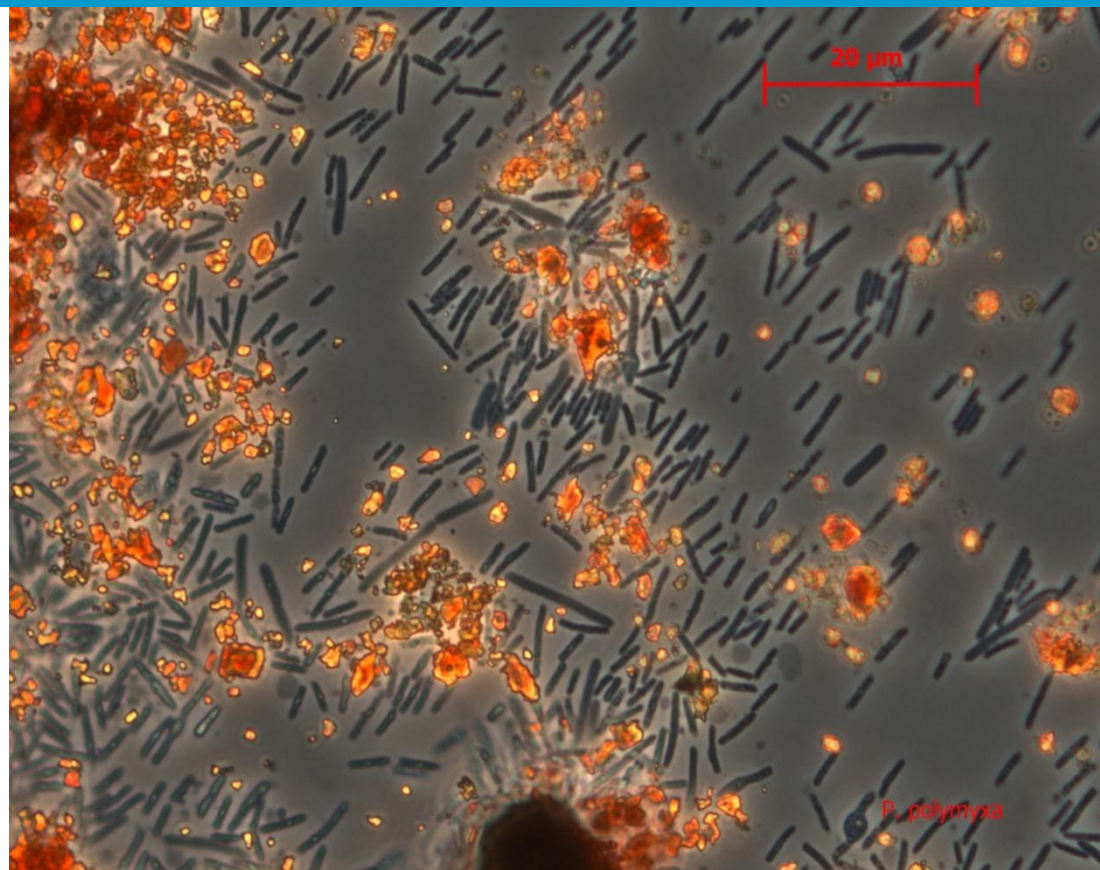
- Alternative leaching technologies are being implemented within the mining industry
- Thiosulphate ligands have been successfully trialled on copper-gold ores as an alternative to cyanide leaching.



Technologies for advancing mineral processing

Bioleaching

- Chalcopyrite currently comprises about 80 per cent of the remaining global copper mineral reserve
- However it is difficult to extract copper from chalcopyrite using conventional bioleaching technology
- JP7 thrives in the extreme conditions required to leach copper from chalcopyrite



JP7 is a microbe that can increase in the effectiveness of bioleaching copper from ore

Technologies for advancing mineral processing

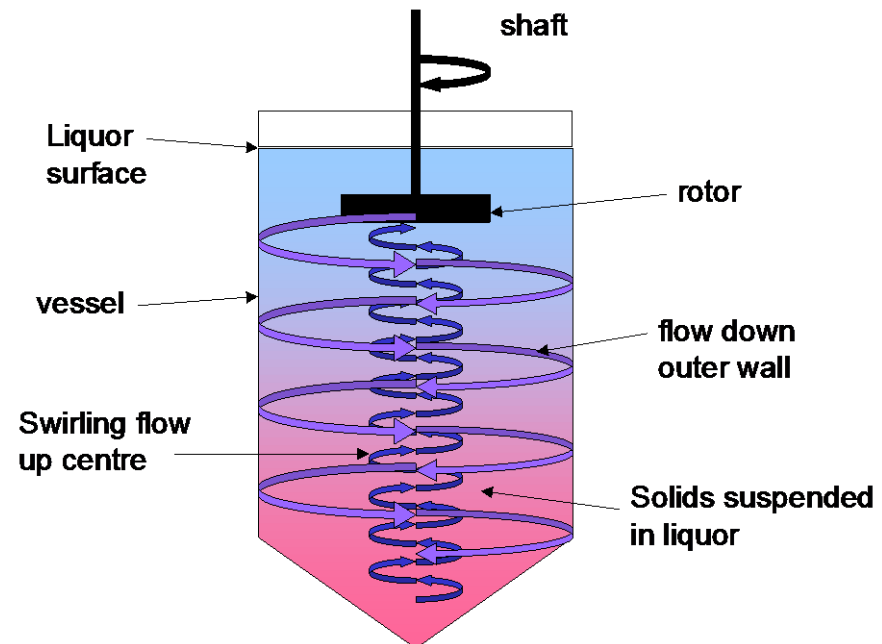
A novel means of mixing liquids and suspending solids in mechanically stirred vessels.

Benefits:

- Major savings (up to 90%) in energy consumption.
- Easier restart after power interruptions.
- Higher, more uniform wall velocities reduce scale formation.
- Capex about 25% of normal installations.
- Maintenance work is conducted outside tank.

15 units in operation in the alumina industry. Industry negotiations are being undertaken for other sectors of industry

SWIRL Flow technology



Technology for securing Australia's carbon steel industry

Bio-char in steel-making

- This process uses biochar to replace a significant proportion of the fossil fuel and reductant used in iron and steelmaking.
- With only 20% replacement of coal with bio-char, a net reduction of 9 million tonnes of GHG could be achieved by the Australian steel industry (This includes credits for by-products such as bio-oil which will be produced during pyrolysis of biomass to produce bio-char).
- Globally, this figure could increase by two orders of magnitude if sufficient quantities of bio-char could be produced from sustainable sources.
- Higher replacement ratios (40% to 50%) for Australian operations are being explored through development of “designer” chars.



Technologies for transforming productivity

LFM moisture analyser

- This low-frequency microwave moisture analyser provides accurate, continuous moisture measurements on line.
- This enables operators to improve product quality, minimise dust and make the most of limited water supplies.
- Commercialised through CSIRO spin-out company, Intalysis Ltd.



Technologies for transforming productivity

Acoustic Emissions Analyser

- The acoustic emission analyser provides continuous, real-time information on the performance and condition of industrial processing units (e.g. dense medium cyclones).
- This provides plant operators with ability to improve throughput, yield and product quality.
- It also has the potential to reduce maintenance downtime.
- Advanced prototype has been trialled and now seeking commercial partner(s).



Technologies for transforming productivity

UltraPS-AD

- The ultrasonic particle sizer provides continuous, accurate in-stream measurement of slurry particle sizes allowing milling operations to be optimised for metal recovery.
- This provides plant operators the with ability to reduce particle size variation and improve product quality.
- Currently in advanced negotiations with commercial partner(s).



Technology for driving sustainability

Dry slag granulation

- A novel granulation method for molten slag that turns the slag into a feedstock for the cement industry.
- This has the potential, in Australia alone, to:
 - save up over 2GL of fresh water per year;
 - reduce greenhouse gas emissions from our steel and cement industries by up to 1.8 million tonnes per year; and
 - capture high grade waste heat for re-use in industrial processes.
 - conversion of millions of tonnes of by-product slag into cement



Technology for driving sustainability

Using mining by-products to reduce algal blooms

CSIRO research has shown that some mining by-products can be effective in preventing nutrients from entering river systems, thereby reducing the potential for algal blooms

- By-product added to soil at a turf farm in the Swan Canning catchment
- Was shown to remove 97 per cent of phosphorus and 82 per cent of nitrogen from the shallow groundwaters.
- Adding the by-product also reduced water use and improved turf health



Technology for driving sustainability

Towards zero waste & toxic emissions

- **Value recovery from sulphide tailings**
 - Concept developed through bench scale tests
 - To be evaluated through 0.5M tpa pilot/demonstration plant
 - Export magnetite fraction – dense media and iron making
 - Potential use of silicates for construction
 - Base metals could be recovered with further processing and sulphide fraction could be treated to avoid acid mine drainage
- **Early removal and safe disposal of minor/toxic elements**
 - Concept being developed through CSRP and AMIRA P970 projects
 - Likely to add much value to low grade ores with high arsenic levels, while capturing minor elements at early and disposing of them in a safe manner.
- **Geopolymer concrete from mineral industry waste**



Technology for driving OH&S performance

Real-time Risk Management

The Issue

- It is vital that mine operators are continuously aware of underground conditions and risk profiles, and that communication systems stay active during power outages, fan stoppages or gas accumulations.

However, there are often:

- many different communication systems in use at most sites
- large numbers of system-generated false alarms
- time delays in locating people
- cumbersome manual statutory reporting systems, and
- extreme workloads in emergency situations

One of CSIRO's solutions:

- **The Nexsys™ Real-time Risk Management System for underground mines comprises:**
 - The Nexsys™ software package.
 - An electronic report-capturing system.
 - A suite of Ethernet-based, fibre optic and intrinsically safe (IECEX.ia) communications devices suitable for use in potentially explosive atmospheres.
- **Nexsys™ can:**
 - Source information directly from proprietary systems
 - Integrate and interpret the data, and in accordance with a pre-determined set of rules, initiate a response to breaches of these rules
- **Nexsys™ will in the future:**
 - Apply to open pit stability risk monitoring

Thank you *Terima kasih*



Wayne Robertson
Theme Business Development Manager
CSIRO

Contact Us

Phone: 1300 363 400 or +61 3 9545 2176

Email: Enquiries@csiro.au **Web:** www.csiro.au



The Mining Equipment Technology and Services Sector - “the next big thing”

Tom Hunter and Tim McLennan
Directors – Queensland AUSTMINE



The Mining Equipment, Technology and Services Sector



- What is this “METS” sector
- What is Australia’s role and why is it important.
- Where to from here.....



What is the METS Sector?

- It is called many things, MTSE, MTS.. But it is all around
- Equipment (manufacturing and design and fabrication of heavy engineering through to smart scientific equipment)
- Technology (the smarts across the value chain from exploration to mine closure and support)..
- Services either contracting or consulting (from exploration surveys, mineralogical analysis through to logistics and HR down to EPCM activities)



Australia's Place

- Probably number 1 in the world
- Based on the historical depth of the industry
- Supporting international growth of many Australian companies
- Strong tier structure (global to local)
- Strong innovative approach (driven by cost focus of mining partners, challenges of Australian endowment, strong R&D sector and supportive Federal Government)

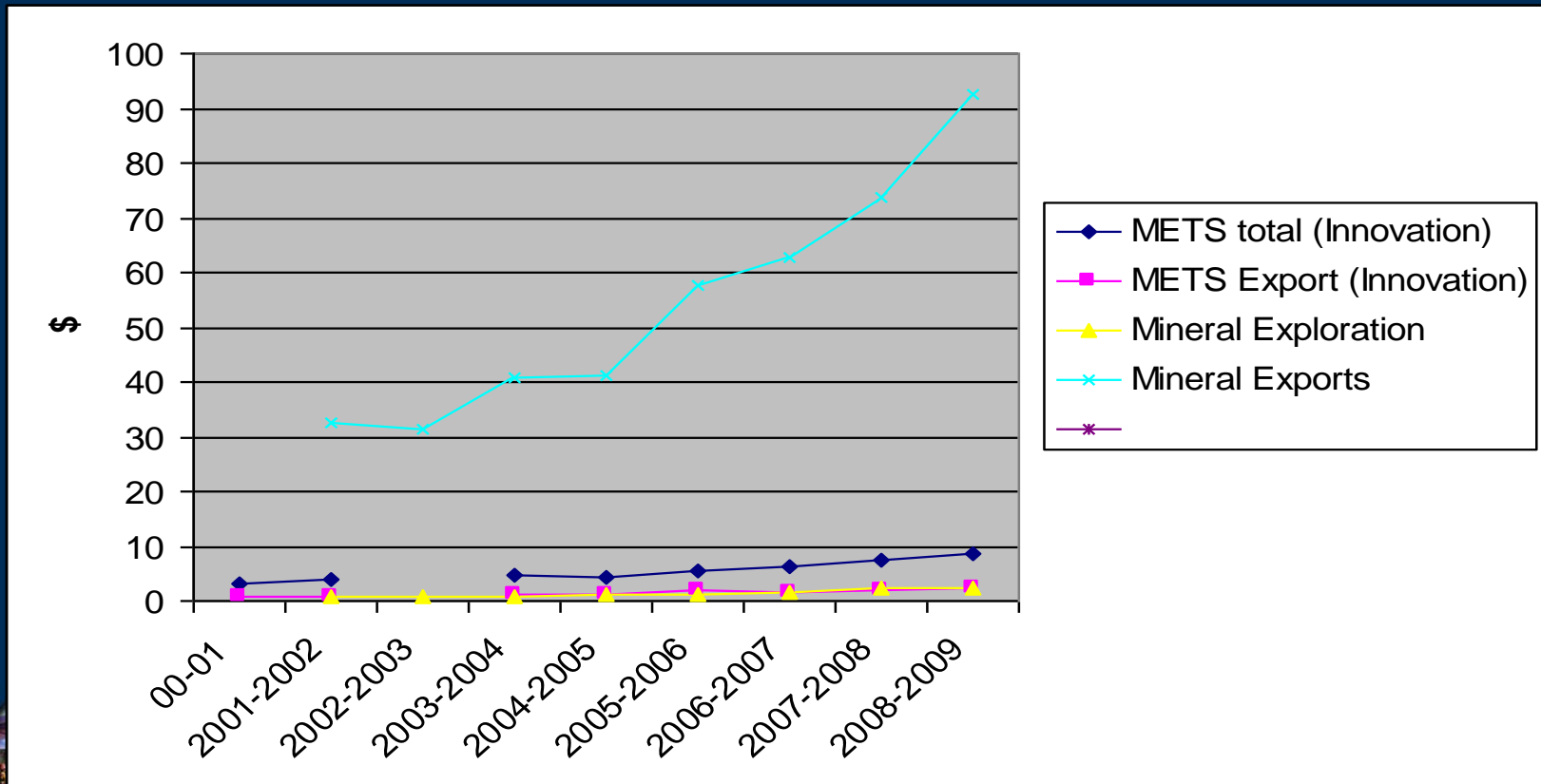


Size and Scale

- Our estimate:
- **Total Revenue:**
~\$35-40B
- **Total Employees:**
250,000+
 - HighGrade Survey of top 80 Cos (22 Feb 2010) (\$27.5B) and 25%plus for the “long tail”
- **Innovation component:**
~ \$9B
 - ABARE 2010 Survey - \$8.7b
- **Export component of Innovation aspect at least \$3B**
 - ABARE 2010 Survey - \$2.7B



What does that mean?



A U S T M I N E Mon 22/02/2010

Exclusive survey: Australia's leading mining service and technology companies



Richard Roberts, 9 February 2010

The domestically owned and based portion of Australia's mining technology and services sector is a \$A27.5 billion industry segment in its own right, directly employing more than 82,000 people. It grew by nearly 19% overall in fiscal 2009 despite the harsh downturn in mine and exploration spending.

A HighGrade survey of 80 leaders highlights the resilience of the sector and, in all probability, the next group of IPOs and/or M&A targets.

Fifty-five per cent of the companies surveyed reported higher revenues in their fiscal 2009 compared with FY08, with perhaps a further 12.5% posting

flat figures year-on-year.

Revenue generated by the 80 companies canvassed by HighGrade exceeded \$A27.45 billion in FY09, compared with \$A23.13 billion in FY08, an 18.7% difference. Some 82,725 people work for the companies surveyed. The public/private ownership split was 45/35.

Western Australia is Australia's MTS main-state, with 34 of the 80 companies calling it home, followed by Queensland with 20, New South Wales with 11, Victoria with seven and South Australia with four.

Without rounding up figures for the myriad smaller companies servicing the mining industry both within and outside Australia, and for a few elusive larger, privately owned firms such as Pybar Mining, UME Australia, Hofmann Engineering, Minepower, SBD Drilling, Metzke Engineering and Nepean Group, the \$A27.5 billion puts Australia's MTS sector among the country's rich economic lodges.

Most of Australia's metallurgical coal, iron ore and gold is exported and the value of these exports in 2008-09 was \$A36.7 billion, \$A34.2 billion, and \$A16.1 billion, respectively.

The MTS numbers should defuse carping criticism of the lack of economic value-adding around Australia's coal and minerals production, among the latest examples of this being a comment article under the heading, "Resource riches can be an economic curse", in the Australian Financial Review last week.

Authored by a University of Western Sydney academic, Dr James Arvanitakis, and NSW Greens politician, Lee Rhiannon, the article is scritical of Australia's reliance on mining as "the engine of economic growth at the expense of manufacturing and other value-added areas", and advocates the introduction of a new mining tax regime by the federal government to raise monies for "sustainable, low-carbon industries".

Presumably "value-added areas" such as advanced design and engineering, consulting, financial services, IT, and energy and resource saving technology are only kosher if they're not geared towards mining.

The country's abundance of resources had "served Australia well", Arvanitakis and Rhiannon said.

"But it is time to think about a more innovative future. We have the chance to lead the world in innovative manufacturing solutions related to alternative energy resources, education and research, and development."

The Australian Government could also devise better policies to spur investment in the innovative manufacturing and services industries that it has.

The country's MTS sector, comprised of the following leading companies, has not enjoyed anything like the trade protection afforded US industry, nor the state funding for, and paternal arms around, Europe's leading mining equipment makers. Yet many of these companies are pushing out into new territories around the world at a faster pace each year on the back of the domestic market strongholds they've won.

- **1. Orica.** FY09 revenue: \$A5.04 billion for Orica Mining Services/Minova (FY08: \$A4.35 billion), 15,000 employees (group). ASX-listed public company. Headquartered in Victoria. World's largest manufacturer/supplier of mine explosives, blasting services, rock reinforcement products. []
- **2. Leighton Holdings.** FY09 revenue: \$A4.67 billion contract mining revenue (FY08: \$A3.48 billion), 40,000 group employees. ASX-listed public company (54.98% owned by Germany's Hochtief). Headquartered in New South Wales. World's largest contract miner; provider of



So how do we compare?

- Another great mining nation is Chile.
- The market size of that METS sector is around US\$7.5 B. Only US\$500 M. comes from exports.
- Mining companies in Chile still import US\$2.5 B of services etc.
- The Chilean National Innovation Council has estimated a Global Market of US\$200 B.
- Exportable market size is about a fourth of that (US\$50B).
- *(Thanks to I. Garrido, O. Hernández and P. Vielma. Mining Area. InnovaChile by CORFO. 2010 for this information)*



Where to for the METS

- New technologies to meet the increasing challenges in the Australian based Industry
- Recognition of the importance of this sector to driving innovation as well as expanding the regional and national economy.
- Stronger bilateral partnerships with key countries
- Greater Globalisation - and we are well positioned



Collaborative Models

- AUSTMINE
- AUSTRADE
- MESCA
- AusIMM
- AMEC
- MCA
- NEW ZEALAND
- CHILE



Key Features of a Successful Australian METS Company



The METS company needs to:-

- have a technology solution that solves a minerals industry problem
- understand the mining business and language
- maintain good working relationships with clients at all levels of the mining business, ranging from corporate head office to the mine site
- be customer focussed
- be recognised by its customers as supplier of first choice
- employ skilled and experience people
- collaborate and network with others linked to the sector to progress innovation
- have a dynamic web presence that includes a good informative website outlining company capabilities and product lines, which potential Australian and overseas customers can use to identify companies.

Thank You

