

Demand, supply and price of copper – an exploration perspective

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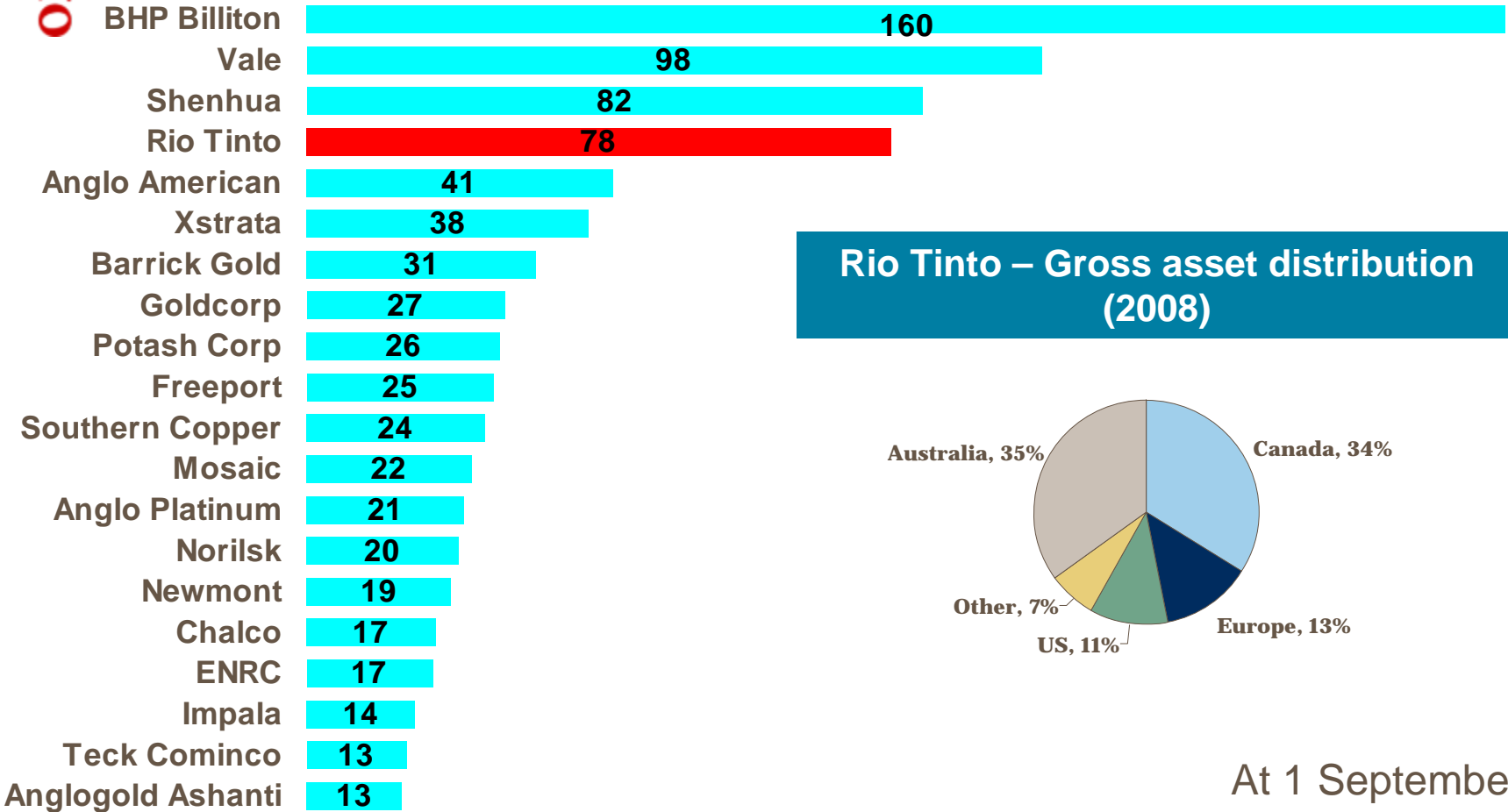
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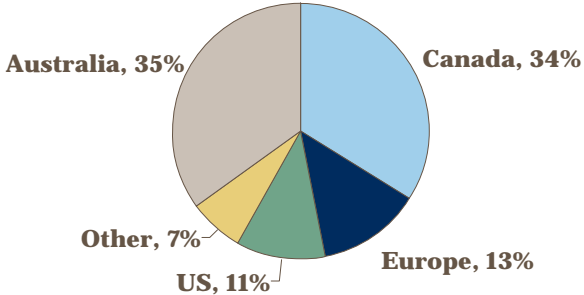
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Market capitalisation of major listed mining companies



Rio Tinto – Gross asset distribution (2008)



At 1 September 09



Source: Thomson Datastream

Rio Tinto – a world leader in mining



Aluminium



Copper



Iron Ore



Diamonds



Energy

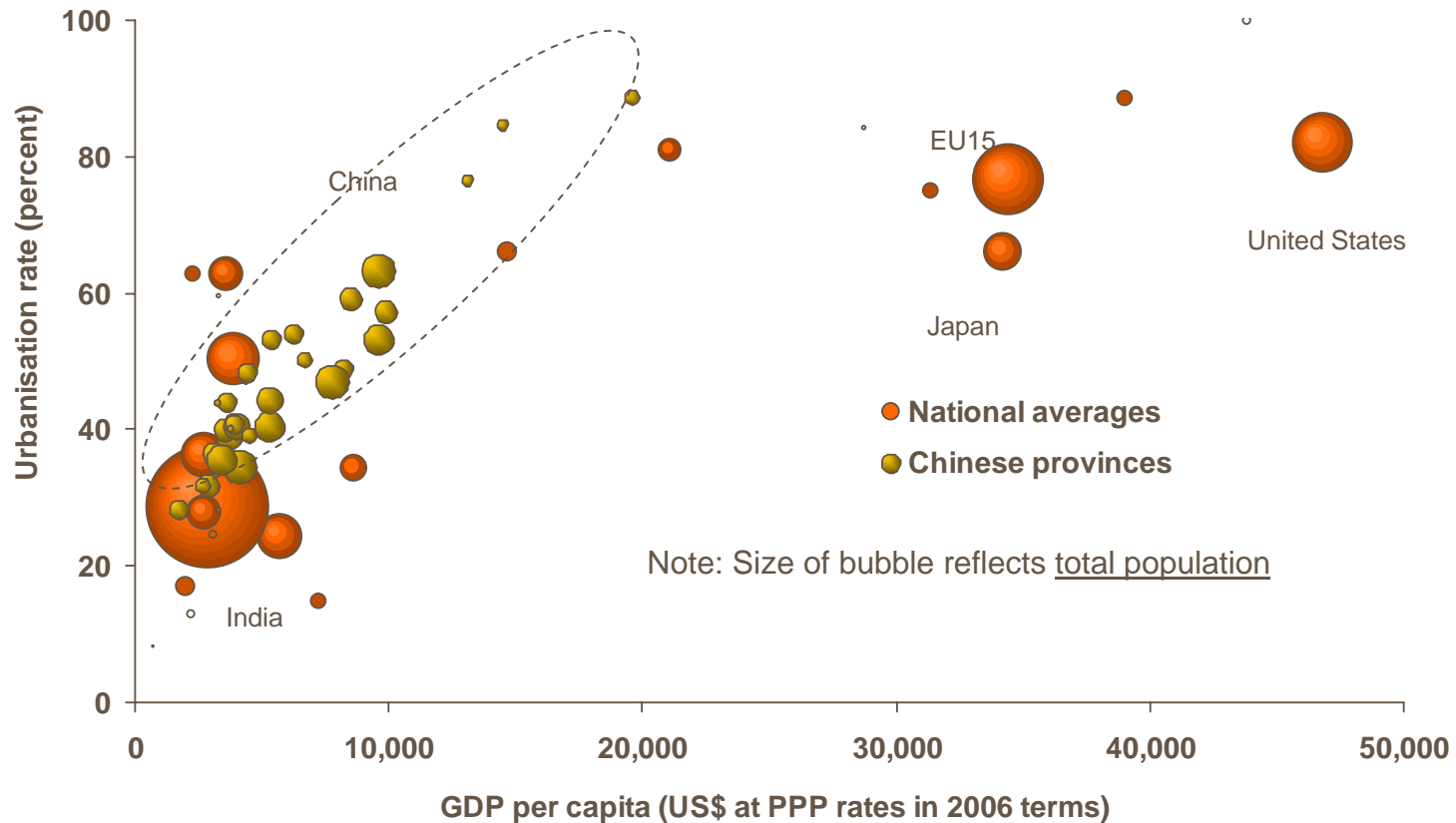


Industrial Minerals

Key drivers for long term commodity demand growth remain intact

Urbanisation rates across Asia, the United States and European Union

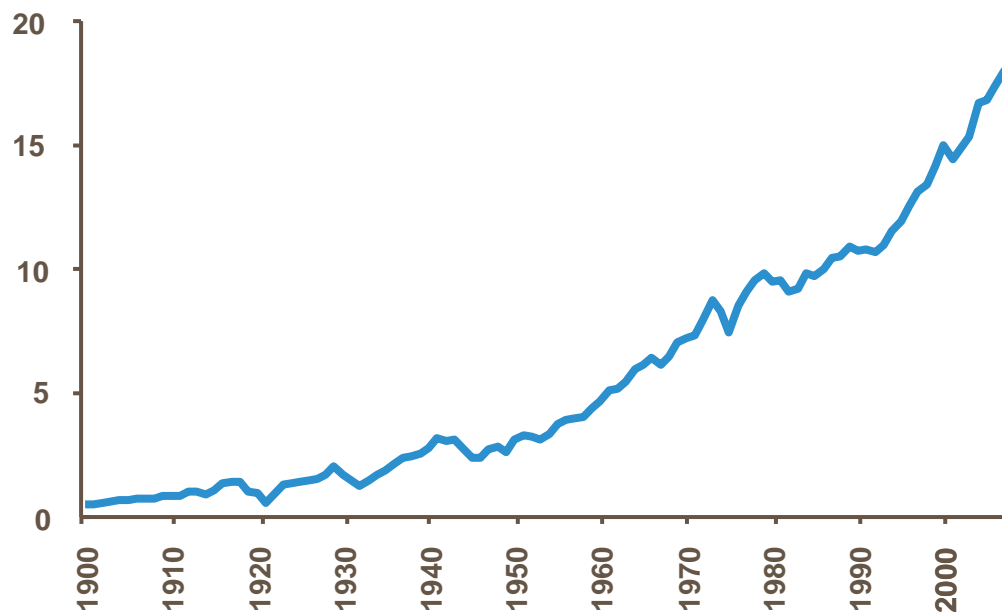
Urbanisation rates, income and population



Sources: Global Insight, CIA Factbook

Global copper consumption

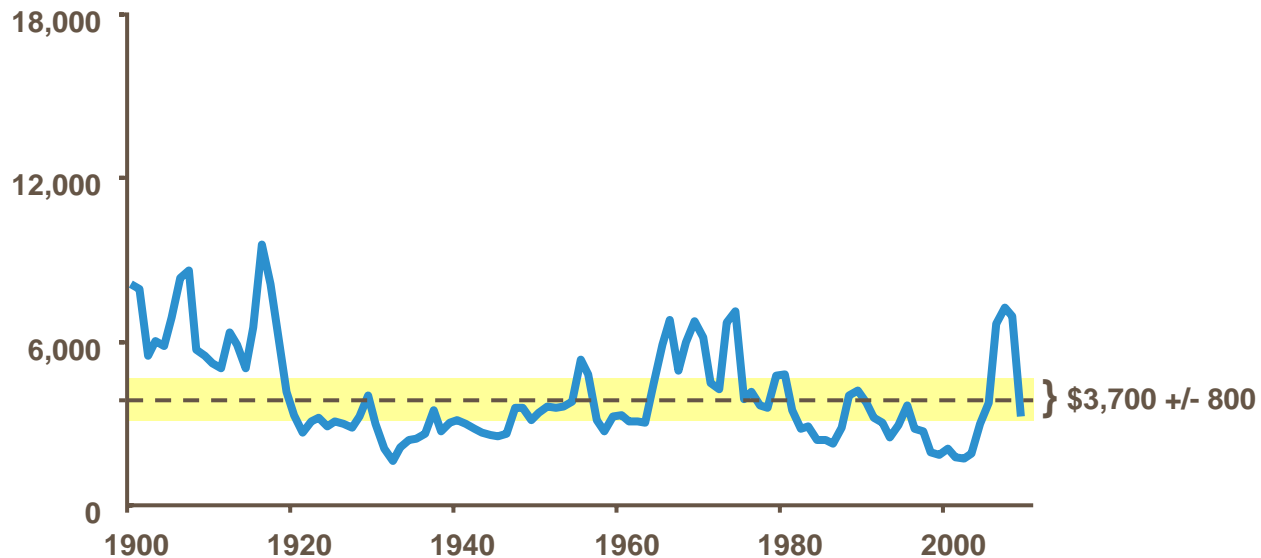
Consumption in millions of tonnes per annum



- Compound Annual Growth Rate (CAGR) in demand over the last 108 years is ~ 3.4%
- China overtook the US in 2003 as the largest consumer of copper
- The proportion of global copper consumed in China will grow as per capita consumption increases

Long-term copper price

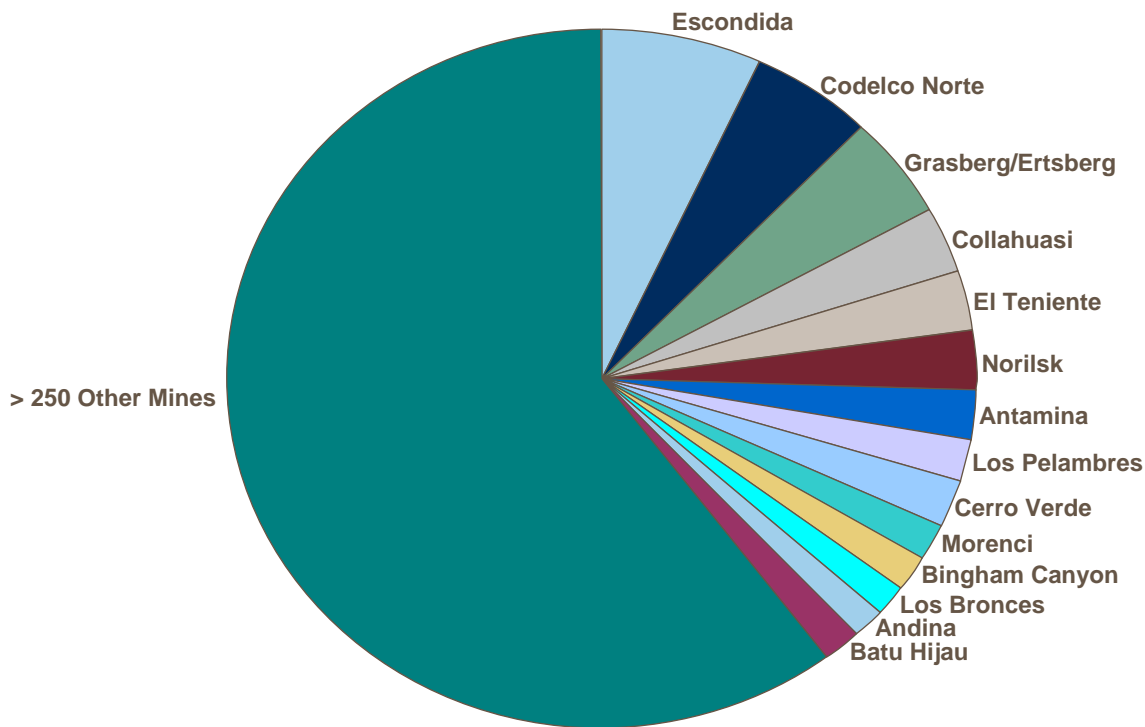
Real prices 2008 US\$ per tonne



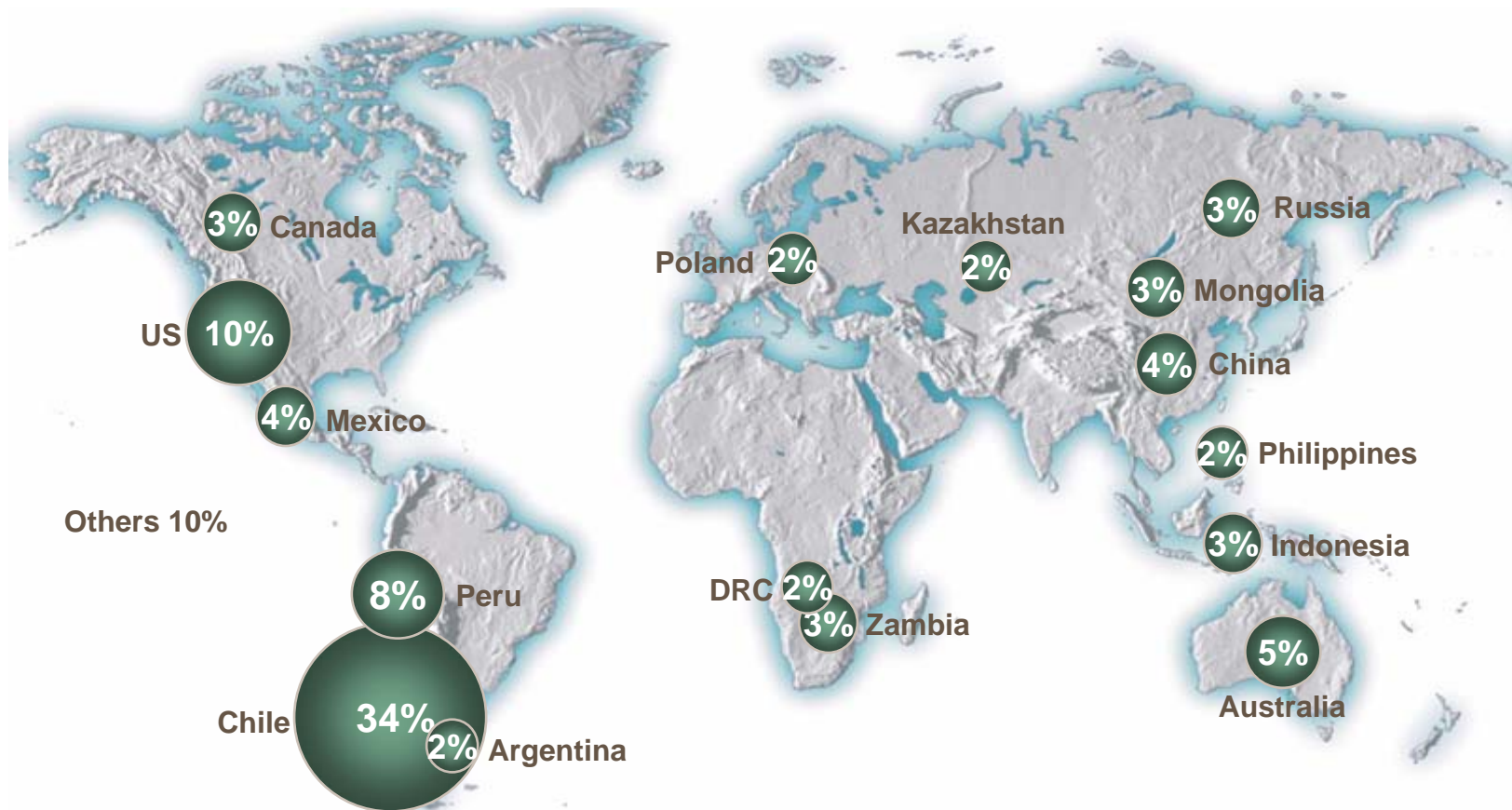
- 1906 – Start-up of the world’s first open-pit porphyry copper mine at Bingham Canyon, Utah
- 1906 - 1920 – Other porphyry copper operations become established
- 1920 - present – The open-pit porphyry copper era of stable mining costs and flat long-term price

Production is dominated by a few operations

Contribution of copper mines to global copper production (2009f)



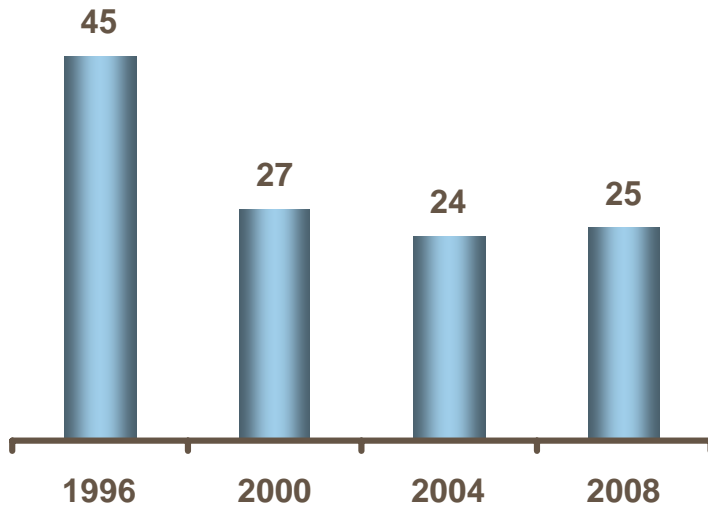
Distribution of copper reserves and resources



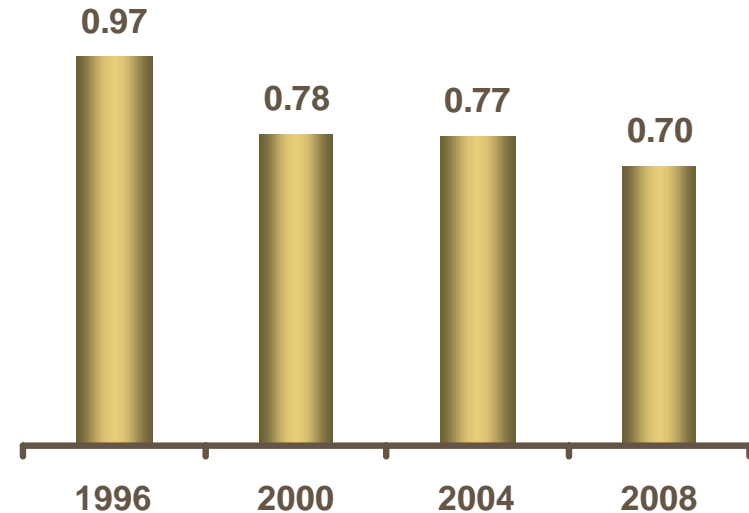
- Total reserves + resources – 1.8Bt contained copper in 953 deposits
- Global average grade is 0.55% copper

Global copper reserves and grades are falling

Global copper reserves - years of production



Average reserve grade - % copper

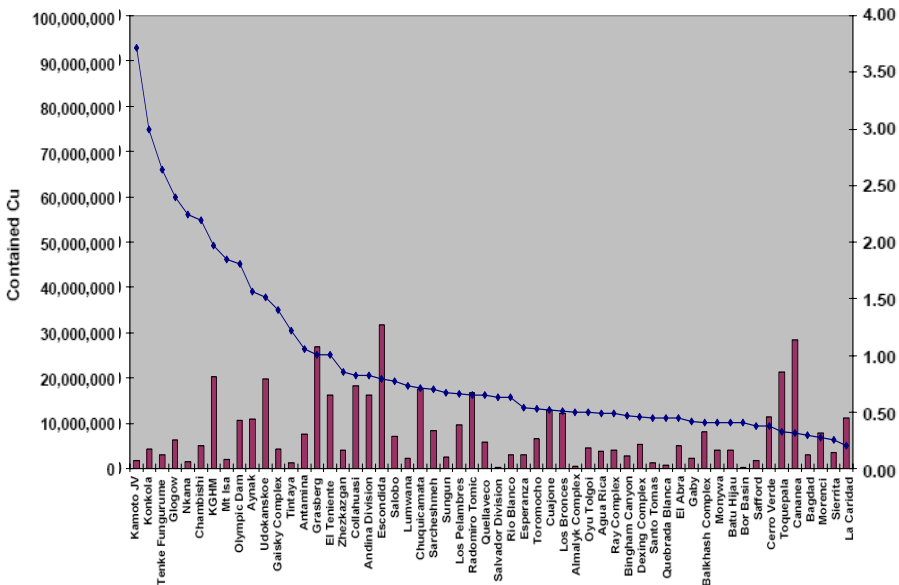


- Data for 217 mines and projects
- Reserves are being mined faster than they are being replaced
- Resource conversion is falling behind production or is focusing on the high-grade parts of deposits
- Selective conversion and mining of high-grade is an unsustainable practice

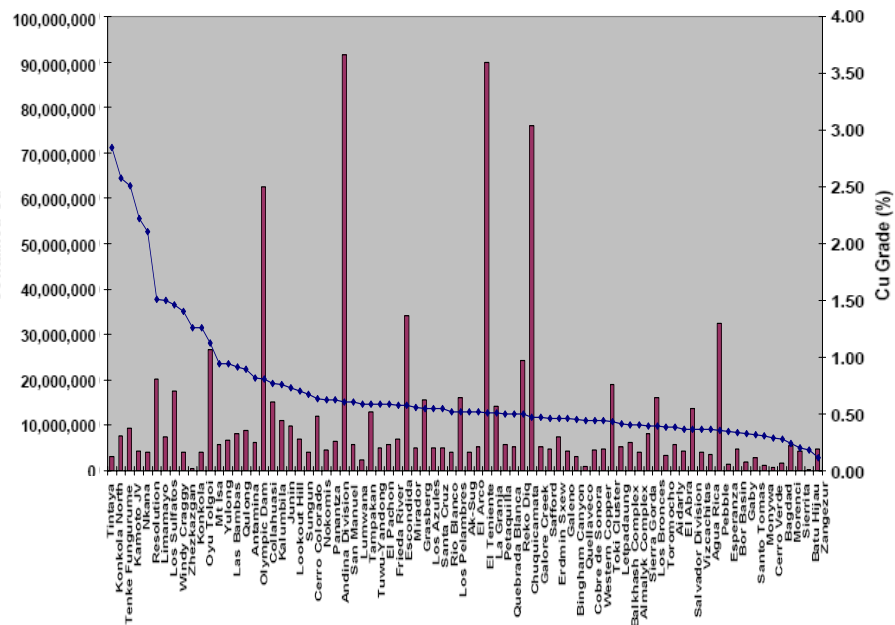
Mined grades will continue to fall

Reserves – Deposits with >4Mt contained copper

Resources – Deposits with >4Mt contained copper



Weighted average grade: 0.88% copper
Total contained copper: 457Mt



Weighted average grade: 0.68% copper
Total contained copper: 909Mt

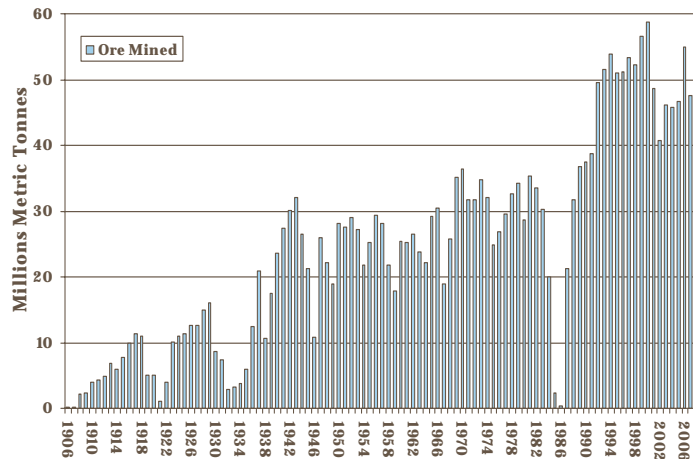
Sources: MEG; FCX 2008 Form 10-K

The challenge for exploration – discovery of new Tier 1 copper deposits

Bingham Canyon, USA



View of the open pit





Production by year 1906 - 2008

- Tier 1 deposits – the largest and highest quality in the world – are geologically rare and confer sustainable competitive advantage
- They grow with exploration and commonly have other Tier 1 deposits nearby
- Their capacity to support production expansions delivers optionality and value growth
- Output from these deposits dominates global copper production

Rio Tinto Tier 1 discoveries

Date	Name	Commodity	Country
1947	Lac Allard	Ilmenite	Canada
1952	Weipa	Bauxite	Australia
1962	Tom Price	Iron Ore	Australia
1963	Kirka	Borates	Turkey
1965	Panguna	Copper	PNG
1967	Ok Tedi	Copper	PNG
1968	Rossing	Uranium	Namibia
1971	Paragominas	Bauxite	Brazil
1979	Argyle	Diamond	Australia
1982	Kaltim Prima	Coal	Indonesia
1983	Lihir	Gold	PNG
1985	QMM	Ilmenite	Madagascar
1990	Century	Zinc	Australia
1991	Corumba	Iron Ore	Brazil
1994	Diavik	Diamond	Canada
1995	Orissa	Iron Ore	India

Date	Name	Commodity	Country
2000	Potasio Rio Colorado	Potash	Argentina
2002	Resolution	Copper	USA
2004	Simandou	Iron Ore	Guinea
2005	La Granja	Copper	Peru
2005	Caliwingina	Iron Ore	Australia
2008	Sulawesi	Nickel	Indonesia
2008	Mutamba	Ilmenite	Mozambique
2009	Jadar	Borates	Serbia

	In operation
	Divested/suspended
	In evaluation

- A discovery is a deposit handed over to a Product Group pre-feasibility study team

Greenfield exploration – the trade-off between discovery potential and country risk

Western Cordillera, Colombia



Porphphy with secondary copper minerals

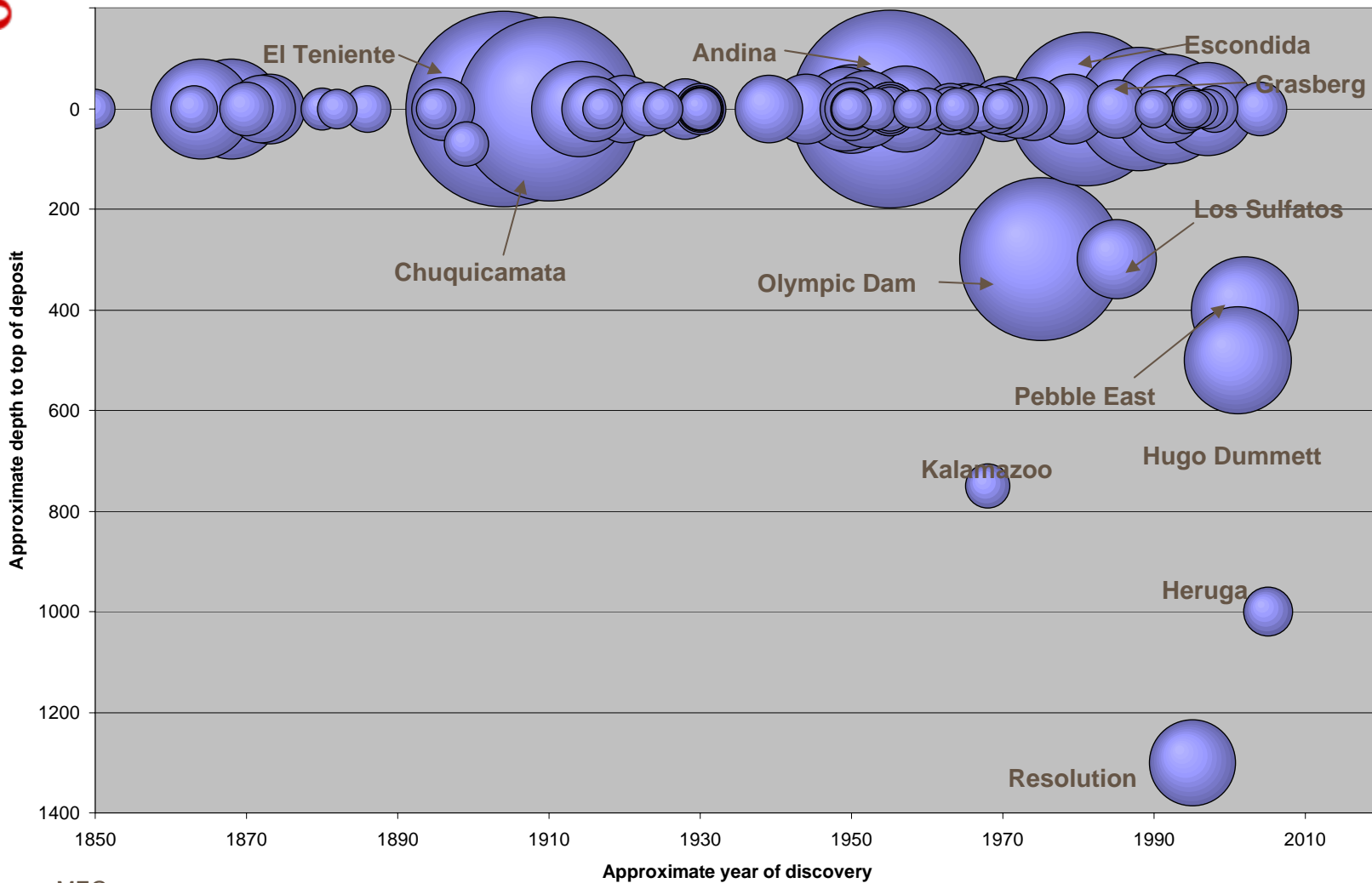


High-grade primary copper mineralisation

IHS Global Insight		
Country Risk Ratings		
Rank	Country	Current Overall Risk
1	Sweden	1.33
2	Luxembourg	1.35
3	Canada	1.40
116	Colombia	3.10
202	Zimbabwe	4.41
203	Democratic Republic of Congo	4.46
204	Somalia	4.80

Deeper discoveries are starting to appear

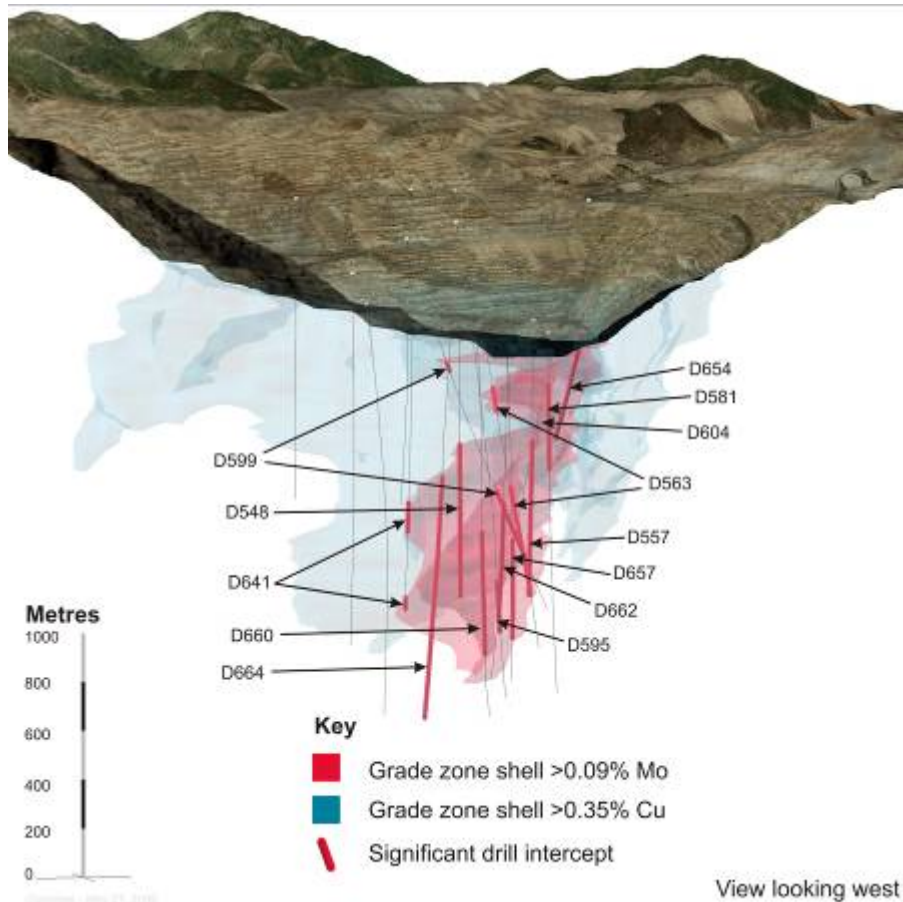
Copper discoveries showing depth of deposits with >4Mt contained copper



Source: MEG

Brownfield exploration – high potential for discovery in an established operating environment

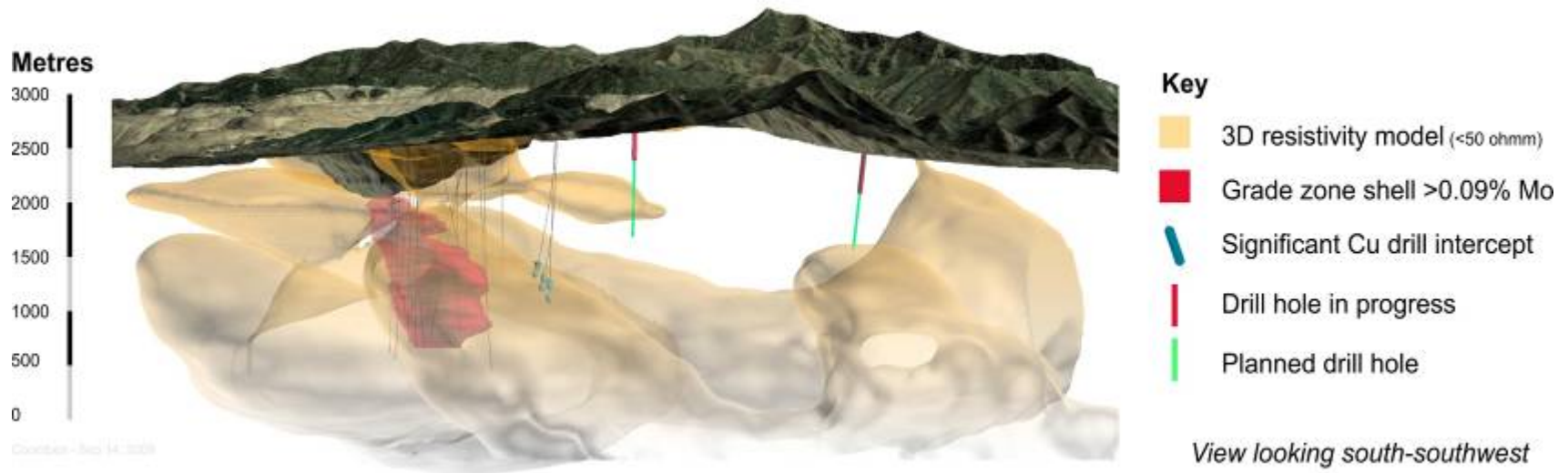
Bingham Canyon – Deep Molybdenum Zone



- Deep Molybdenum Zone to date only partially delineated by drilling (D664 only recently completed)
- Annular body of mineralisation extending >2,000m downwards beneath current open pit
- Current Exploration Target of 500-600Mt @ 0.1 – 0.15% Mo (pre-D664) is likely to significantly expand with further drilling

Bingham Canyon – an emerging mineral district

Bingham Canyon – tip of the iceberg

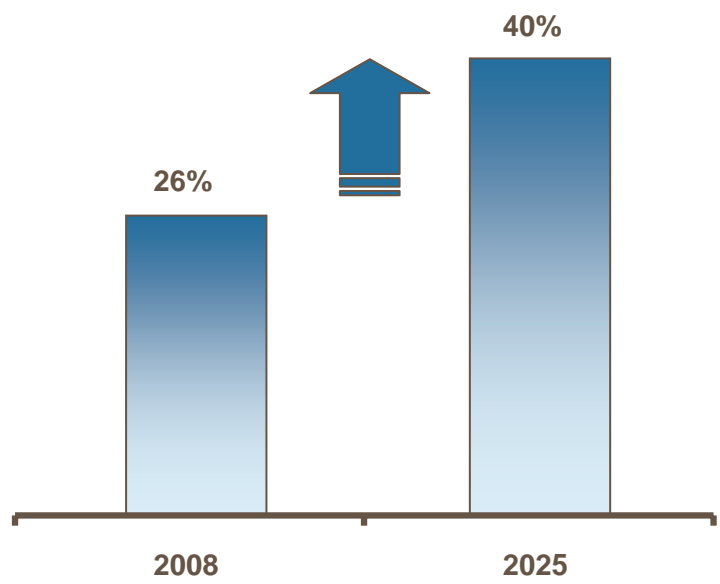


- New geophysical data have traced the Bingham Canyon ore body to depth
- Nearby unroofed intrusions identified for 2009/2010 drilling
- Potential for additional major discoveries within the Bingham Canyon mineral district

Copper mining methods and costs

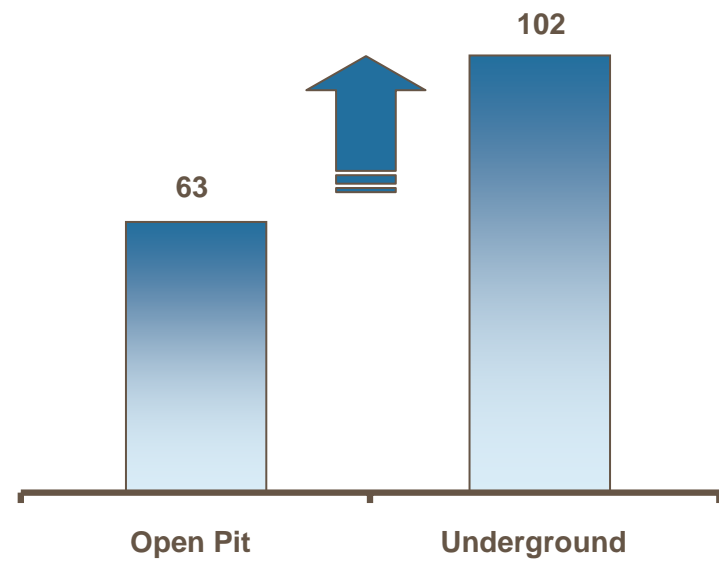
Increasing depth . . .

Underground production¹ - % of global production



. . . means higher mining costs?

Average 2007 C1 composite costs - (c/lb)

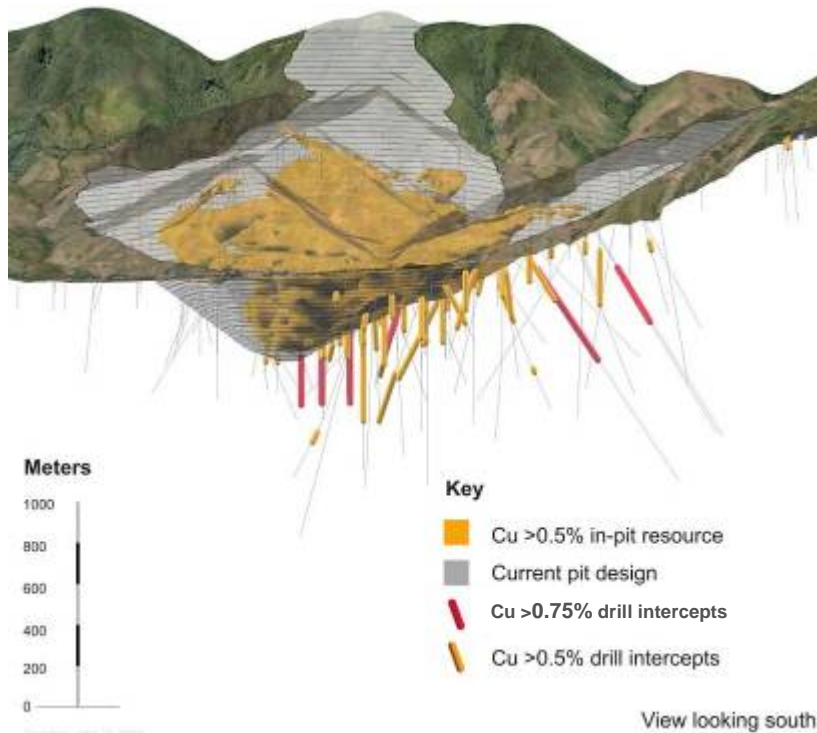


Notes: 1 - Existing mines and funded projects

Source: Brook Hunt

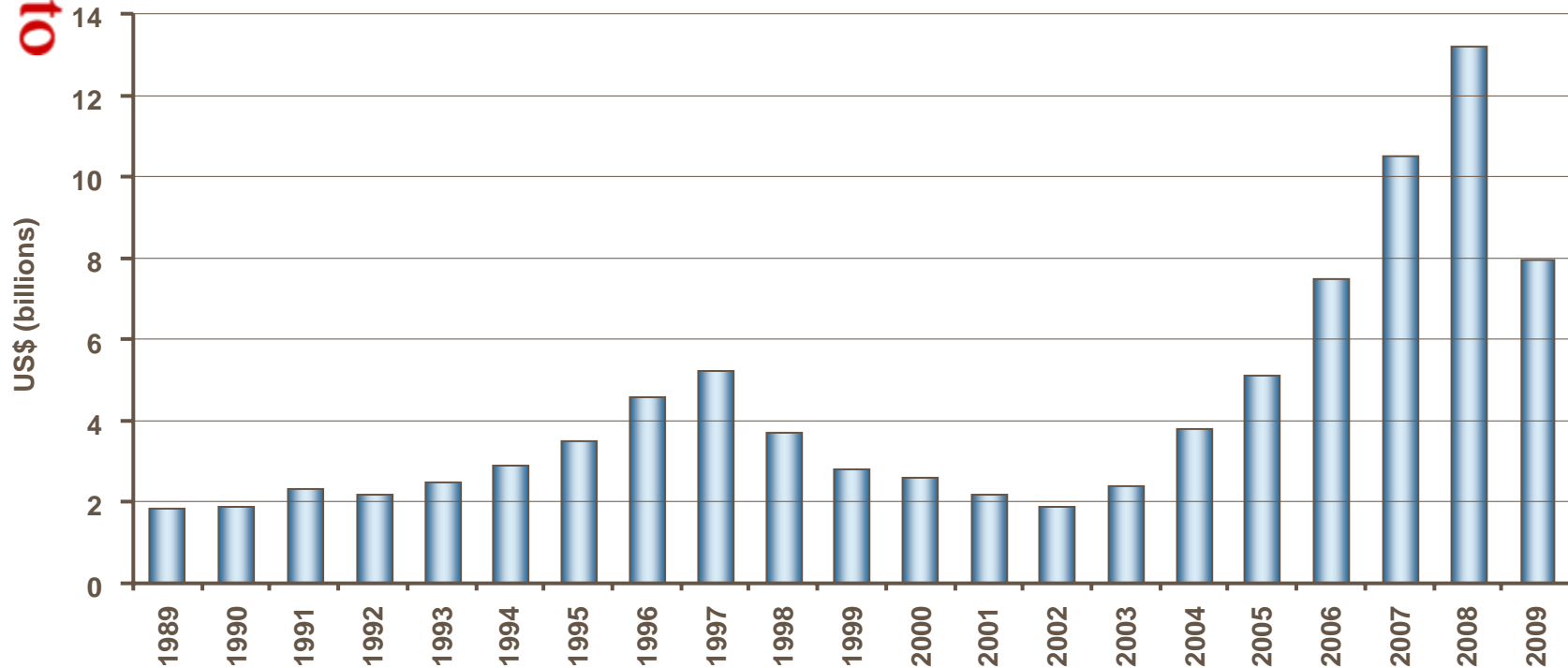
Technology and innovation – unlocking the value of lower-grade mineral deposits

La Granja, Peru



- 2,770Mt @ 0.51% Cu, 0.1% Zn
- Deposit remains open
- Amenable to dump leaching of copper and zinc
- Major new mineralised porphyry found immediately to the north-west – currently under evaluation

Global exploration expenditures



- Cyclicity of exploration spend is normal
- The current economic downturn will have no lasting impact on copper exploration & development

Summary

- **Global copper reserves and resources are sufficient for several decades. Ongoing exploration will continue to deliver new resources**
- **Reserve and resource grades are progressively declining due to depletion of supergene-enrichment blankets in the major producing districts**
- **Greenfield exploration in under-explored countries offers some potential to reverse this trend through new surface copper discoveries. However, the full potential of these countries to support major production may be undermined by sovereign risk factors**
- **Deeper discoveries are appearing in known districts as we explore around surface deposits. Some of these brownfield discoveries have unusually high copper and by-product grades**
- **Innovation in mining and processing technology may reduce the costs of production from lower-grade surface resources**
- **Given forecast future demand, future copper prices will depend on the relative success of greenfield discovery, brownfield discovery and innovation in mining and processing**

Rio Tinto

