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Base Metals Mining: Costs, Margins & Hedging

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Areas for discussion.

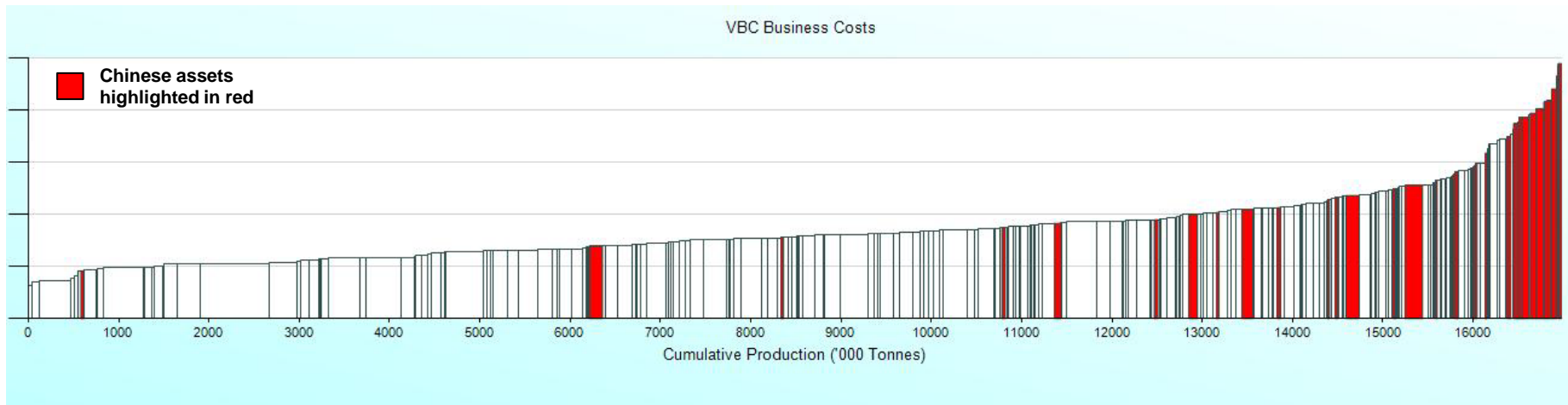
- Who controls base metal mining?
 - What has happened to base metal mining costs & margins?
 - What is the outlook for the sector?
 - How can China benefit in this environment?
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South America still dominates copper production.

CRU Global Cost Curve, 2012, 298 profiles, 17.0 million tonnes.



2012 Production
16.7 million tonnes

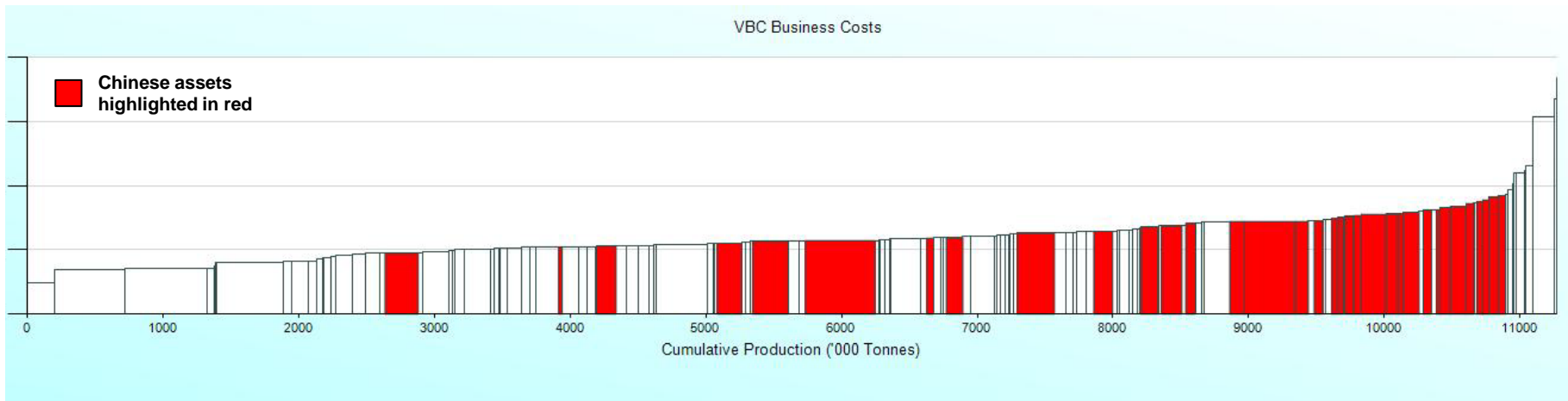
CAGR 2005-2012
1.6%

2012 mine production	000's tonnes	% world
Chile	5,475	32.7%
China	1,629	9.7%
Peru	1,288	7.7%

2012 mine production	000's tonnes	% world
Codelco	1,750	10.5%
Freeport McMoRan	1,345	8.0%
BHP Billiton	1,198	7.2%

China is the world's largest zinc miner...

CRU Global Cost Curve, 2012, 146 profiles, 11.3 million tonnes.



2012 Production
12.3 million tonnes

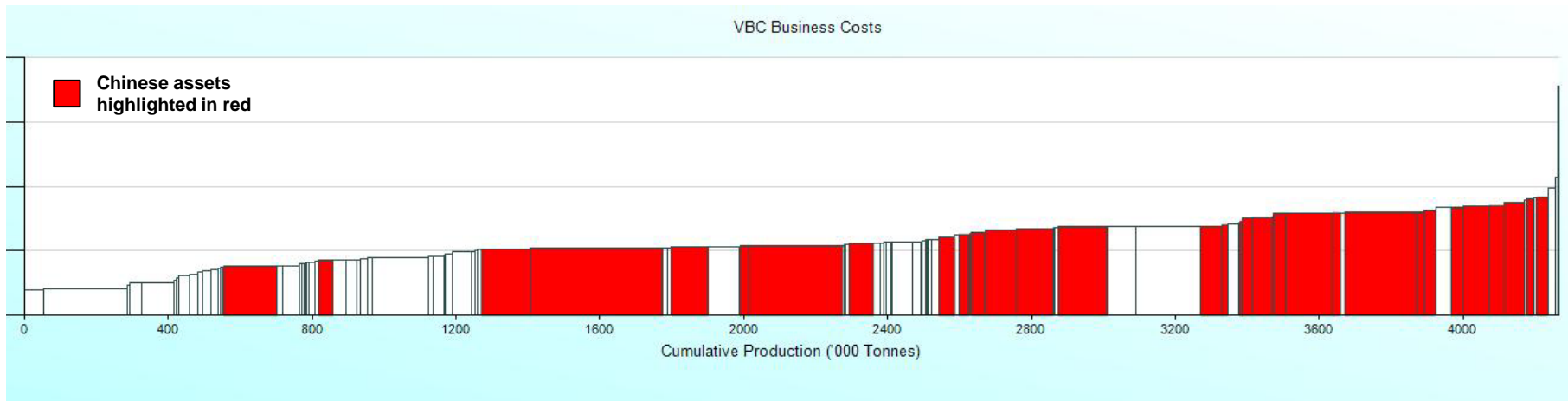
CAGR 2005-2012
3.3%

2012 mine production	000's tonnes	% world
China	4,025	32.7%
Peru	1,179	9.6%
United States	745	6.0%

2012 mine production	000's tonnes	% world
Glencore Xstrata*	1,482	11.8%
Hindustan Zinc	1,080	8.6%
MMG	623	5.0%

...and the world's largest lead miner.

CRU Global Cost Curve, 2012, 124 profiles, 4.3 million tonnes.



2012 Production
4.7 million tonnes

CAGR 2005-2012
4.1%

2012 mine production	000's tonnes	% world
China	2,425	51.2%
Australia	610	12.9%
United States	360	7.6%

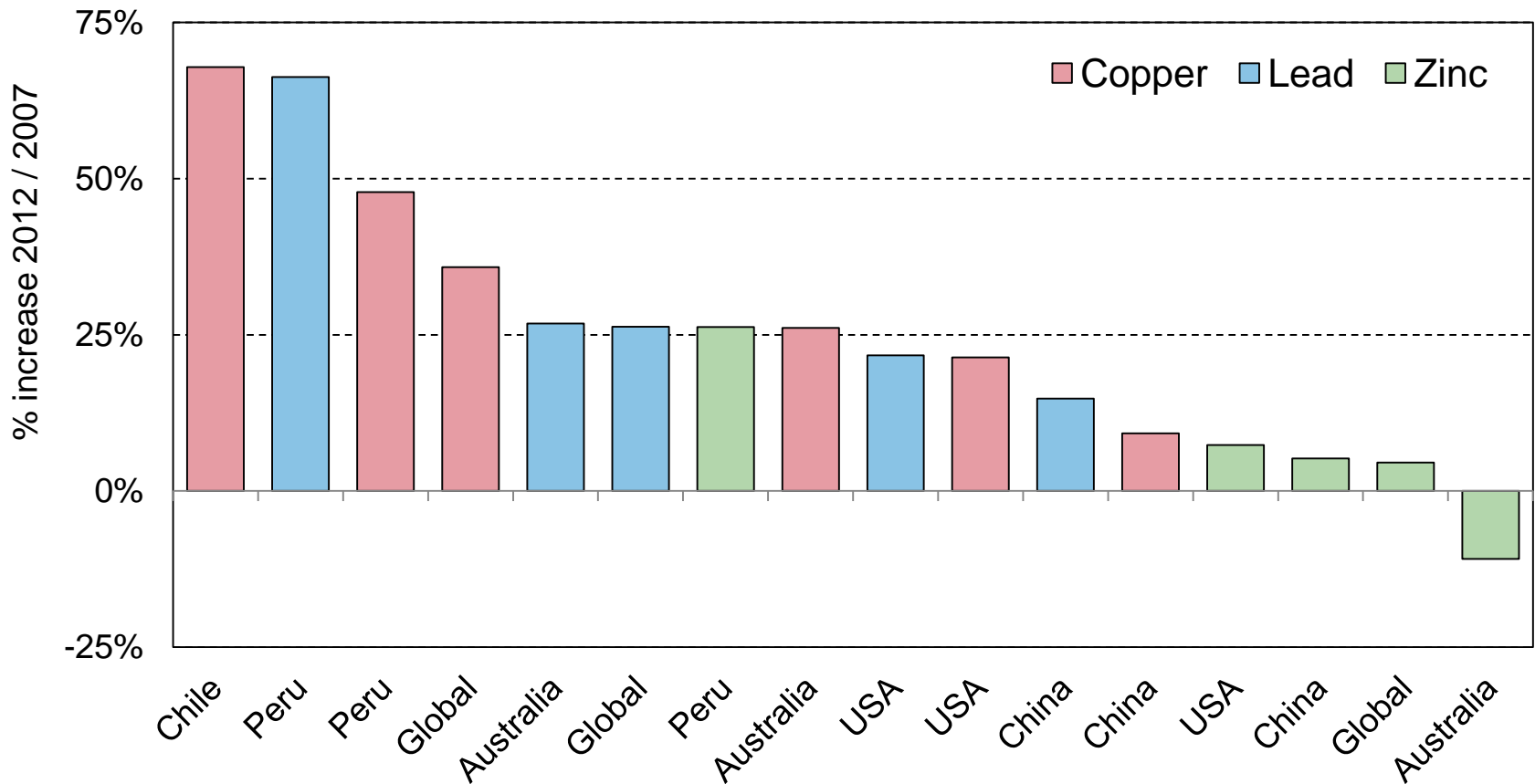
2012 mine production	000's tonnes	% world
Glencore Xstrata*	325	6.9%
BHP Billiton	228	4.8%
Doe Run	206	4.3%

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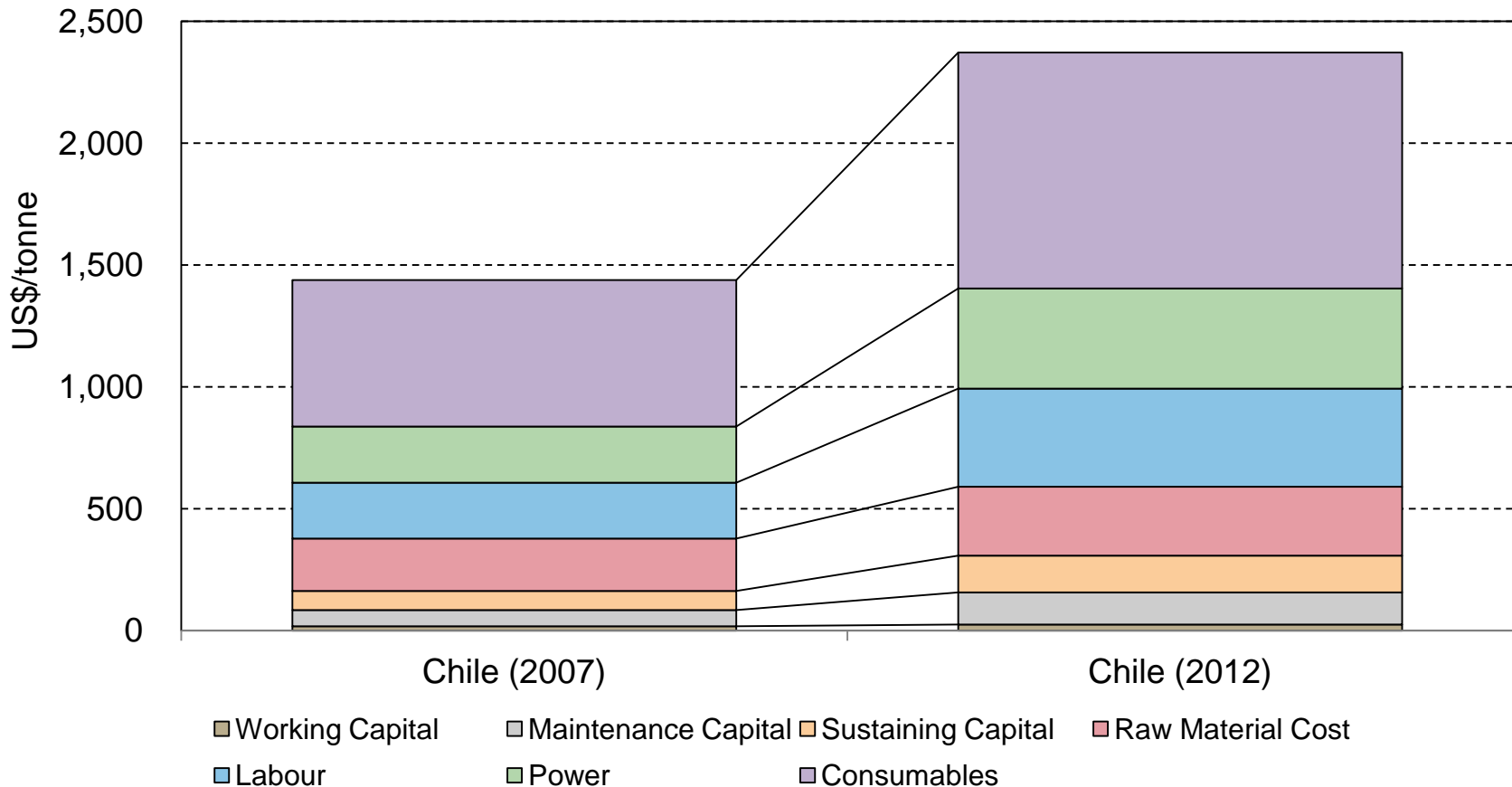
The cost of mining has increased in recent years.

Site mining cost inflation, selected countries & commodities, 2007 vs. 2012



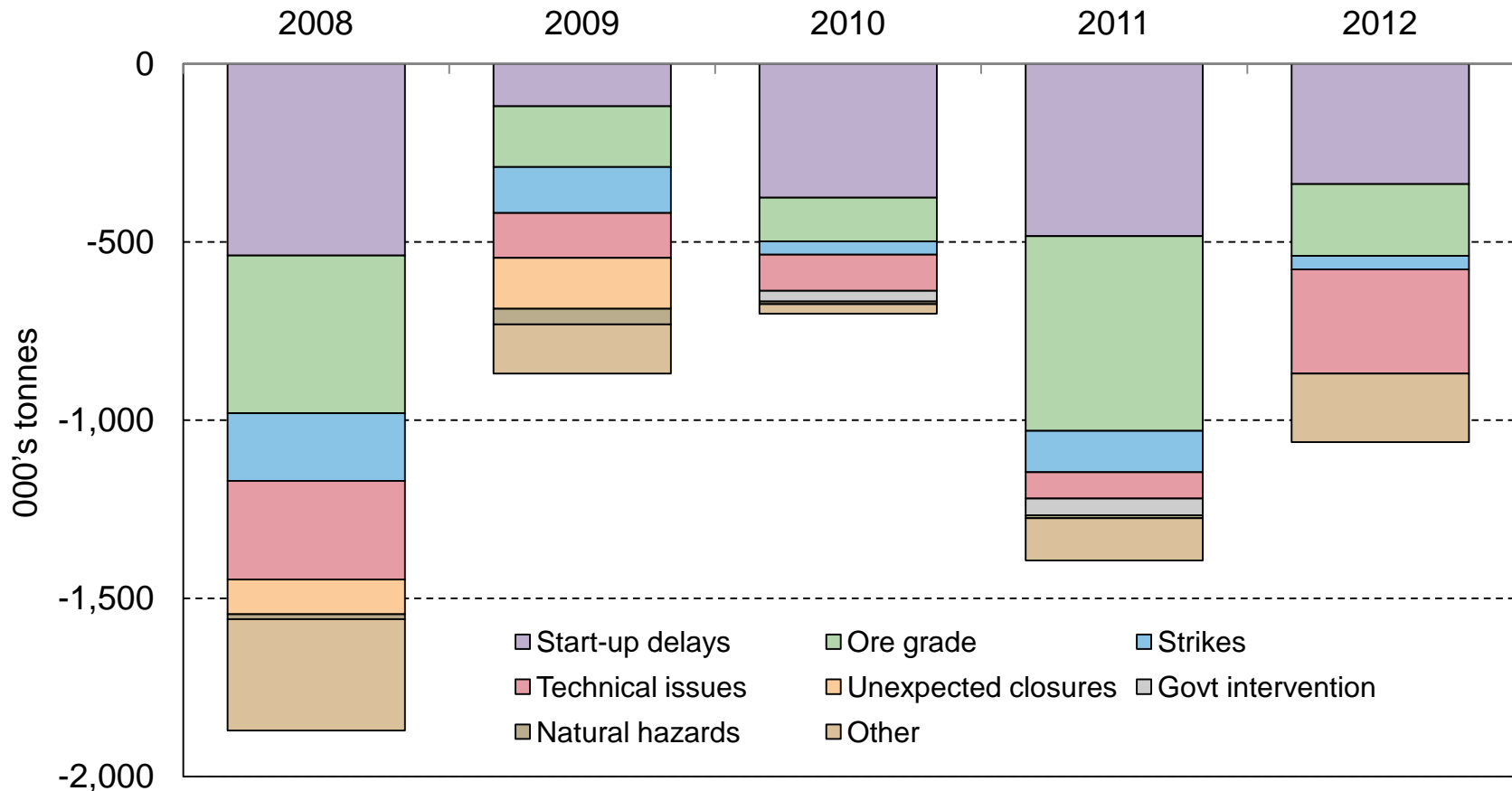
The main cost drivers? Consumables, power & labour.

Site mining cost inflation, by cost segment, 2007 vs. 2012



Start-up delays have also increased mine costs.

Unplanned losses to copper mine production during 2008-2012.

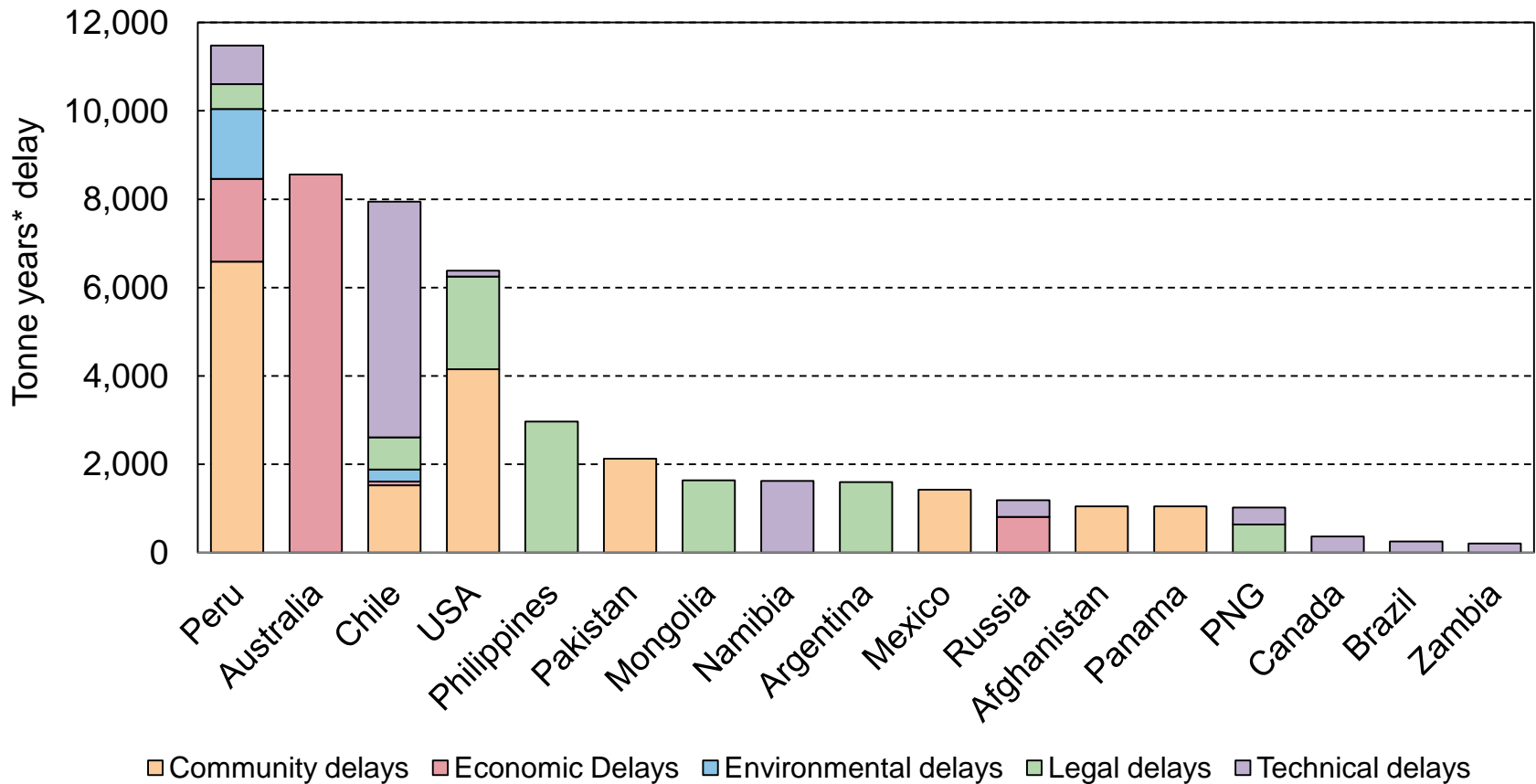


Five factors have been the main cause of project delays.

Delay category	Examples
1. Community	Renegotiation from national government, opposition from local community, labour strikes, mine violence / disruption.
2. Economic	Commissioning delayed due to GFC, funding delays, increasing cost estimates.
3. Environmental	Increasing environmental awareness, resubmission & delays in the approval of EIAs.
4. Legal	Change in tax laws, delays in the issuance of mining licenses.
5. Technical	Further engineering studies needed, difficulties securing power, water or other supplies.

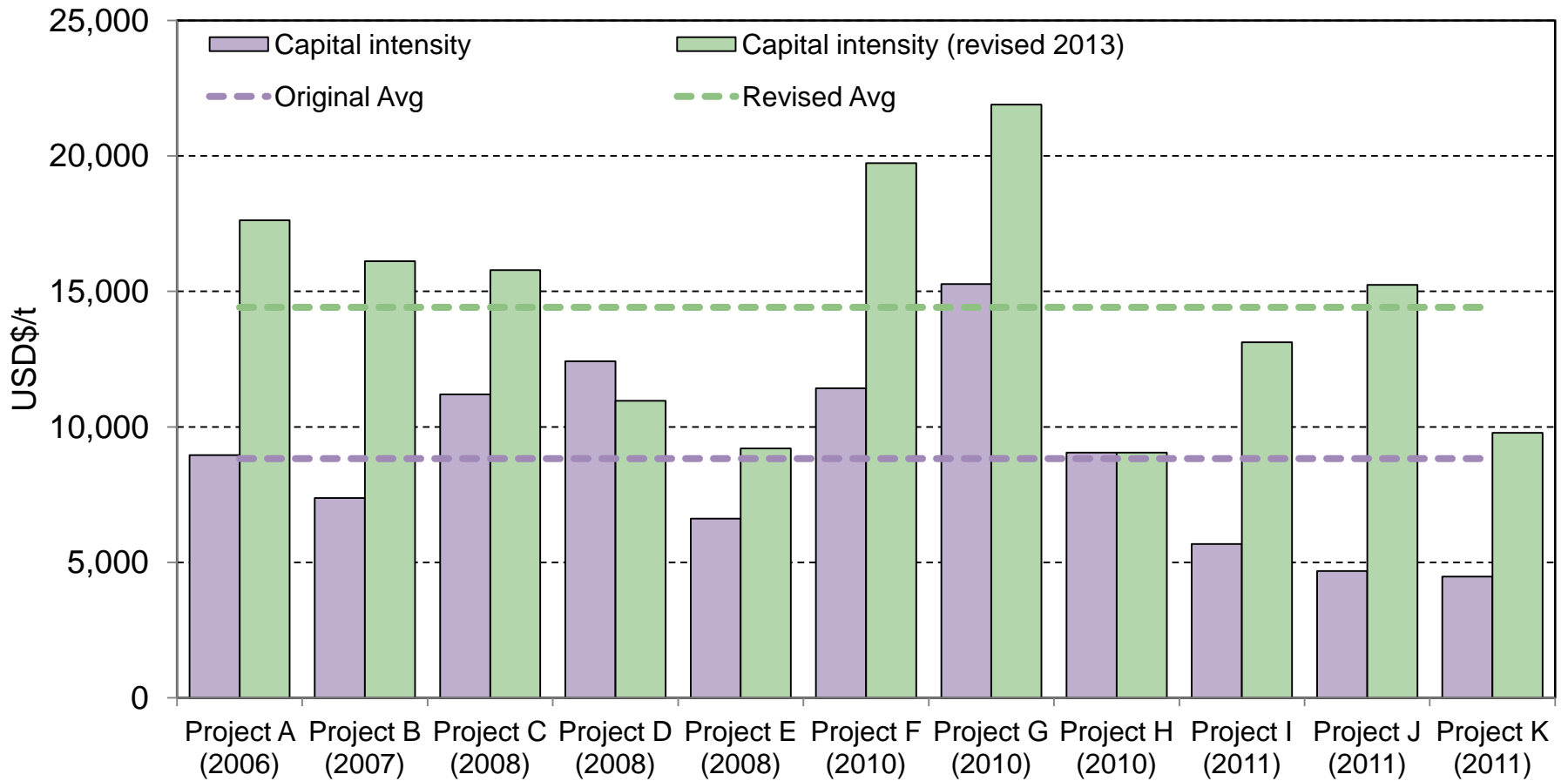
With 'community challenges' causing the greatest damage.

Comparison of initial & current commissioning dates for largest 50 Cu projects.



As a result CAPEX costs have increased by over 60%...

Original estimates vs. revised capital intensity for selected projects.



...and OPEX and CAPEX cost escalations have hurt margins.
...and this has been compounded by recent market events.

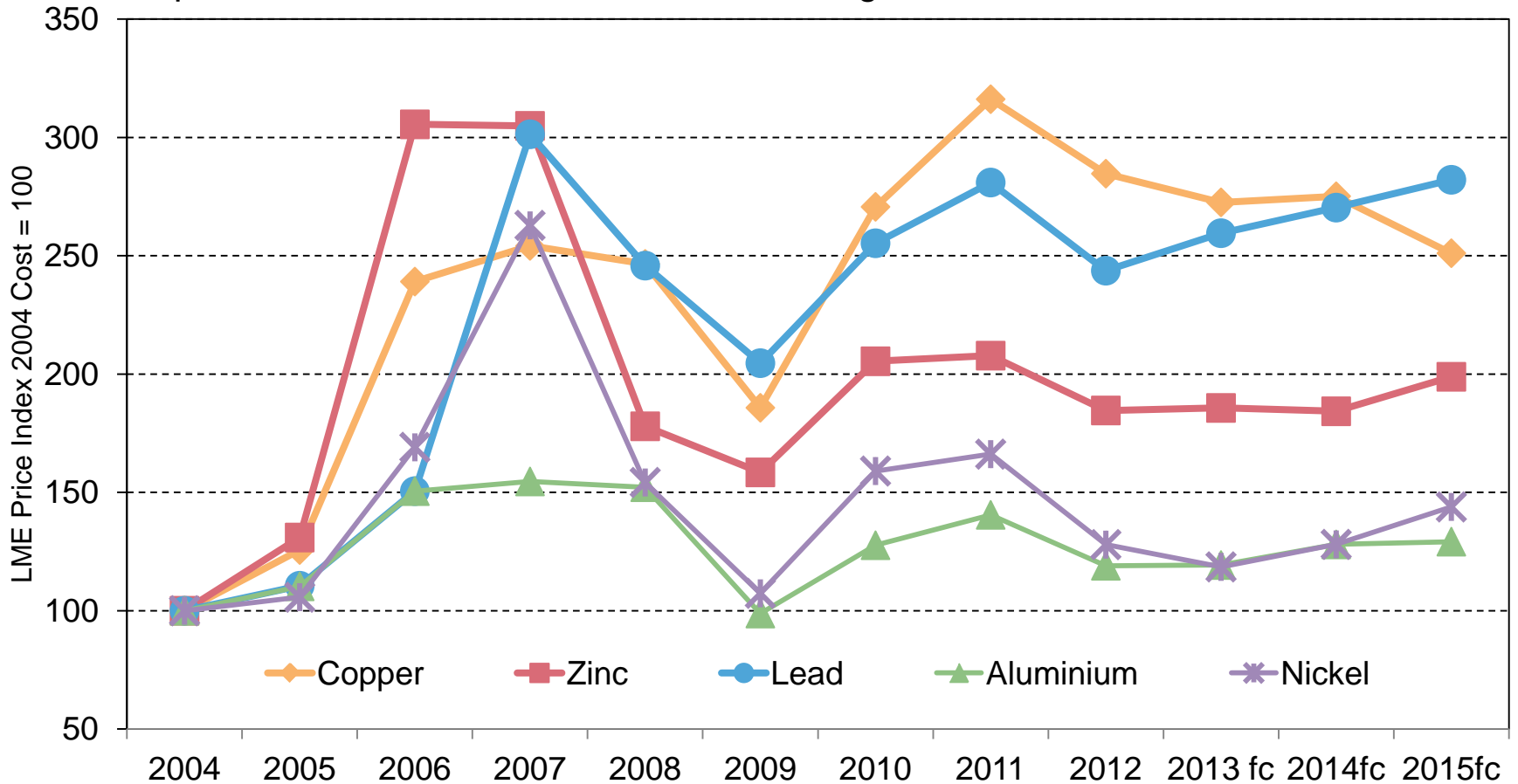


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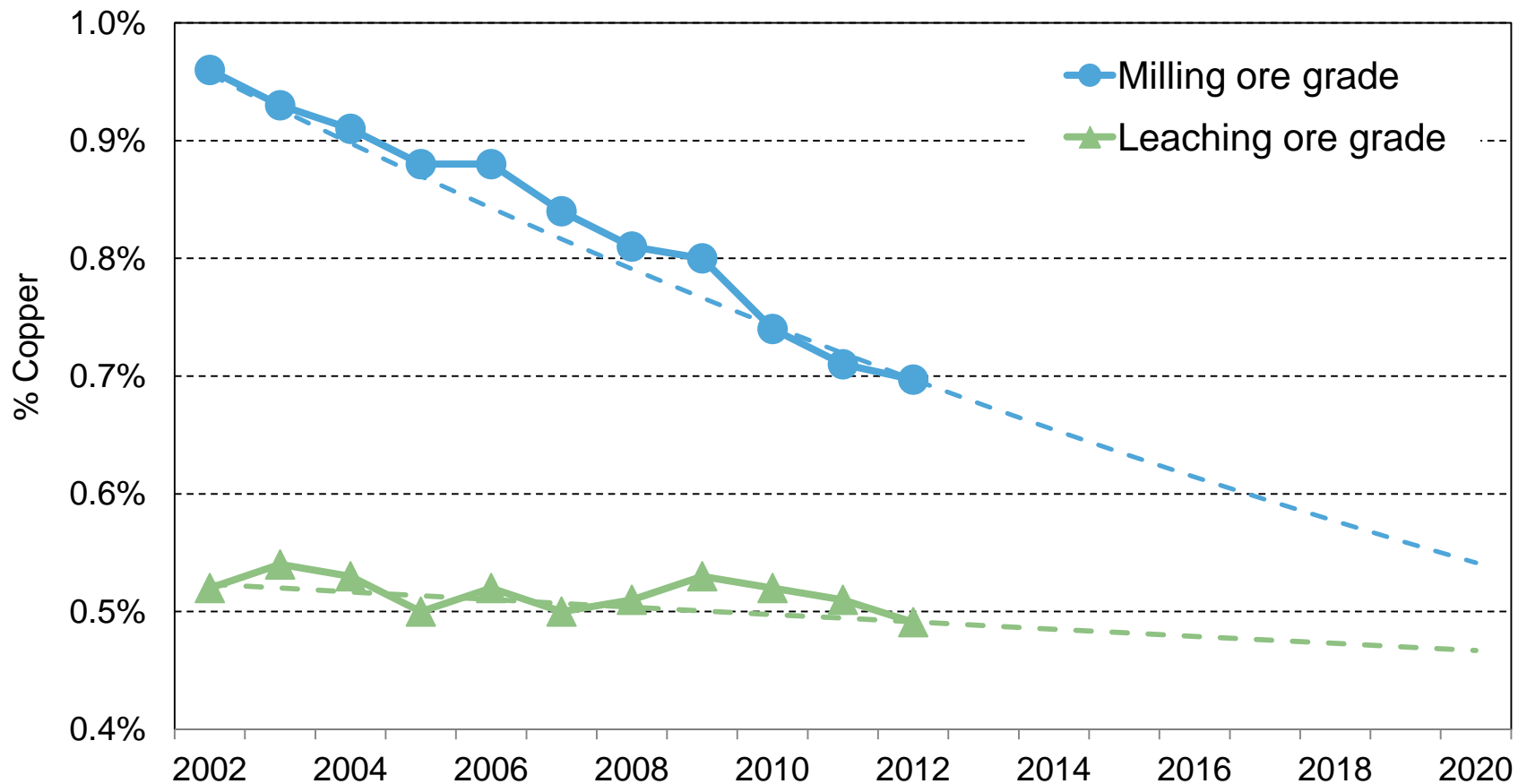
CRU expects market prices to remain flat...

LME metal price forecast index to 2004 annual average.



...and ore grades to continue to fall, increasing costs.

Average global copper grades of milling ore and leaching ore; % Cu; 2002-2012.



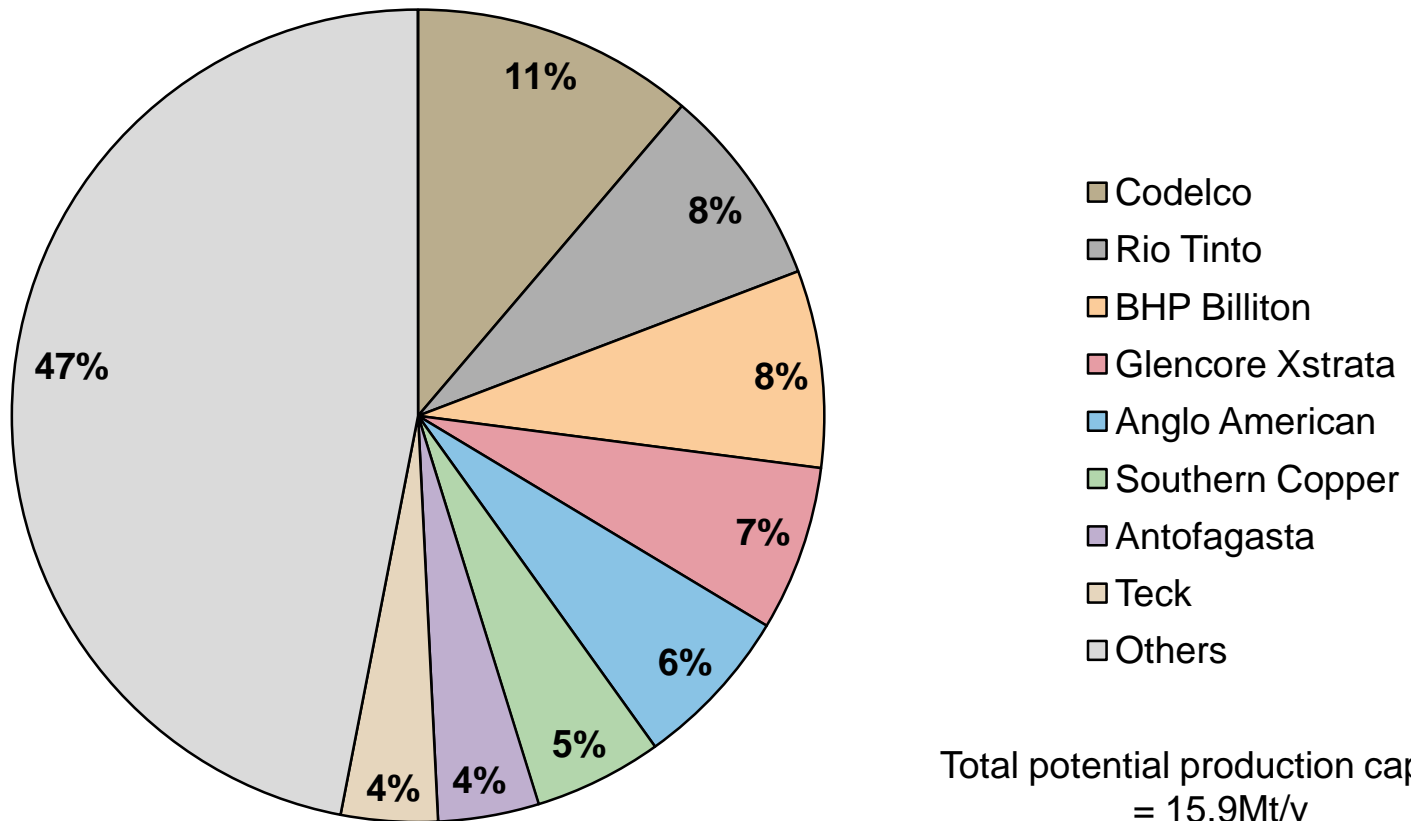
Hedging is a topical subject but there will be limited activity.

- Miners do not have the tools to effectively hedge volume & price.
- Hedging output when input costs are unknown can lock in losses.
- Hedging can tie up a lot of cash through margins & guarantees.
- Shareholders are fickle on this issue.

Expect lots of talk, limited action, some option buying.

Projects will continue to be controlled by the majors...

Ownership of CRU's 91 selected copper projects ('000t/y Cu).



Total potential production capacity
= 15.9Mt/y

...and the new captains suggest investments will slow.



- “capital and exploration expenditure for the 2014 financial year will decline significantly”
(BHP Billiton CEO, Andrew Mackenzie, May 2013)
- “...invest only in projects that deliver returns well above our cost of capital”
(Rio Tinto CEO, Sam Walsh, May 2013)
- “They built, they didn’t get the returns for their shareholders. It’s time to stop building.”
(Glencore International CEO, Ivan Glasenberg, Feb 2013)

Conclusions.

- Who controls base metal mining?

China is self reliant in lead, needs some zinc imports and is very dependant on others for copper.

- What has happened to base metal mining costs & margins?

Costs have increased, projects are delayed, margins have suffered.

- What is the outlook for base metals mining?

Flat revenues, higher operating costs, lower margins. Further project delays, and fewer mining investments.

How can China benefit in this environment?

1. Determine the volume of global projects needed to meet Chinese economic growth targets. Shortfalls will damage China the most.
2. Invest in mining engineers and learn how to mine more efficiently than international miners. Or seek international partners.
3. Find international companies who are seeking Chinese partners.
4. Negotiate with international companies looking for a new owner or to divest assets.
5. Prioritise countries that offer partnership and want Chinese mining FDI.



Thank you for your attention.

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