

# Anglo Base Metals – Copper

Unlocking value from a world-class deposit



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Head of Copper  
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# Agenda



Brian Beamish, CEO Anglo Base

1. Introduction

Duncan Wanblad, Head of Copper

2. Copper Market Overview

Duncan Wanblad, Head of Copper

3. Copper Business Overview

Miguel Duran, CEO Anglo American Chile

4. Los Bronces Expansion Project Delivery

Questions and Answers

Site Visit Overview

The Los Bronces project is aligned with Anglo's growth strategy to focus on large, long life, expandable, low cost assets, with project execution supported by the "Anglo Projects Way"

## 1 Safe Delivery

- Outstanding safety performance is an indicator of the commitment to operational discipline and to Anglo American's guiding values

## 2 Capital Discipline

- Project returns continue to be attractive
  - Capex impacted mainly by risk mitigation factors and scope changes/additions
  - Capital intensity is competitive with comparable peer projects

## 3 Project Execution

- Project team well positioned to deliver
  - Overall project progress in line with plan
  - History of success in working with contractors

## 4 Successful Commissioning

- Local team with vast project and operational experience
  - Cu experience: operations, markets and customer requirements
  - Local knowledge in a low-risk operational environment
  - Leveraging technical expertise from the greater group

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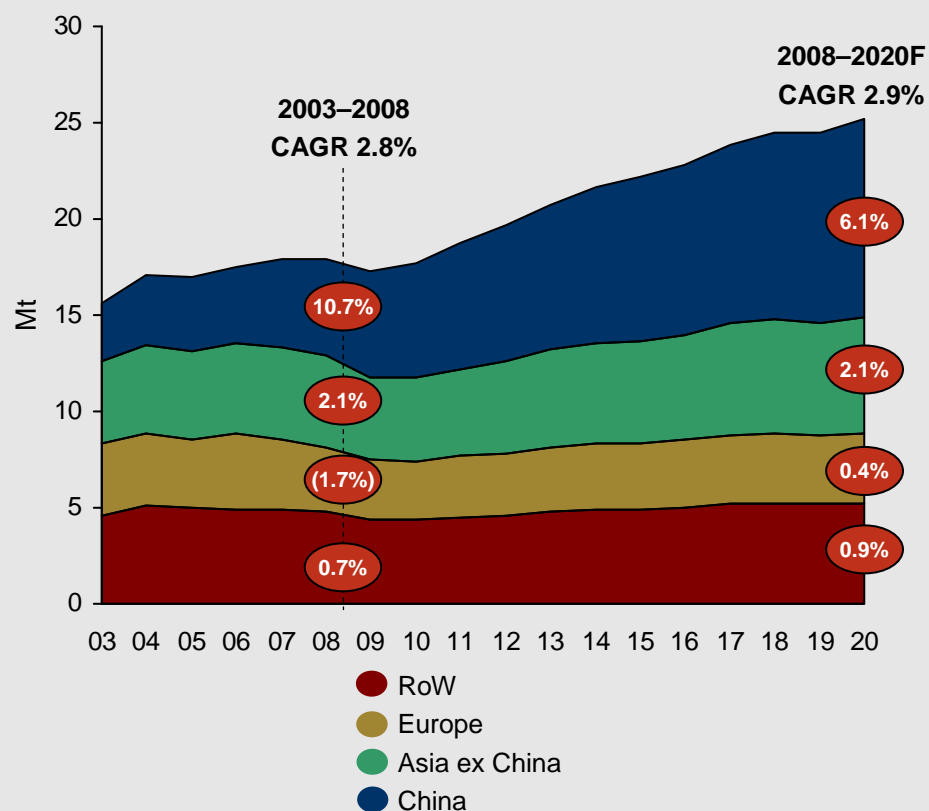
Site Visit Overview

# Copper Demand Outlook



The copper market is forecast to benefit from strong demand fundamentals over the medium to long-term

## Refined Copper Consumption

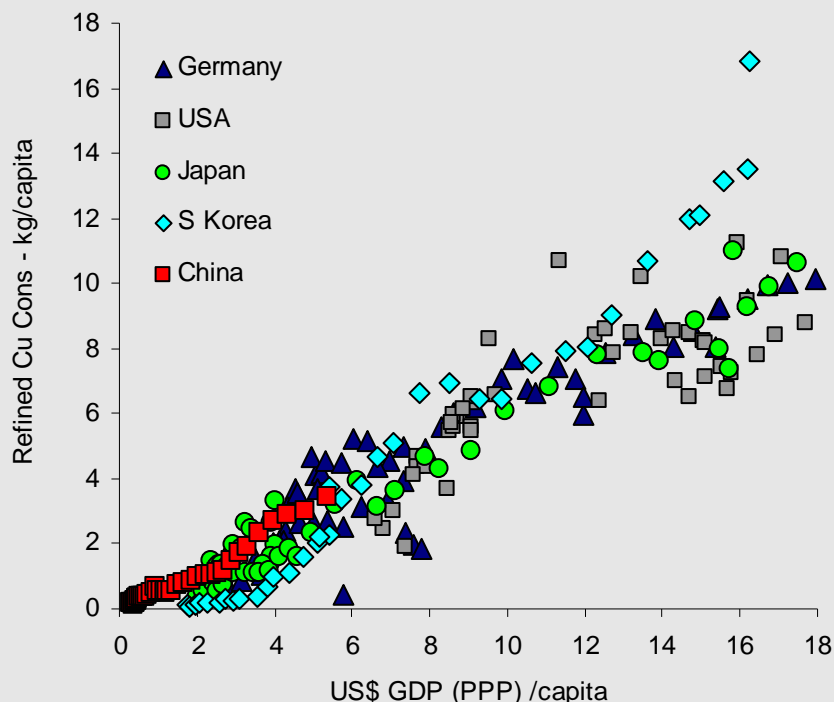


Source: Copyright Brook Hunt, a Wood Mackenzie Company

- The copper market has experienced a marked slowdown
- An even more serious collapse in demand has been averted by very high levels of refined metal imports by China for
  - Consumption, driven by robust demand from the power and construction sectors
  - Industry restocking
  - Non-industry strategic and speculative stockpiles
- Strong long-term growth will be underpinned by
  - Robust growth in copper’s electrical uses, particularly wire and cable in construction, automobiles and electricity infrastructure
  - Industrialisation and urbanisation of BRIC nations

**China accounted for 28% of global first-use copper consumption in 2008 and will remain the principal engine for demand growth over the next 10 years**

**Refined Copper Consumption per capita (First-Use)**

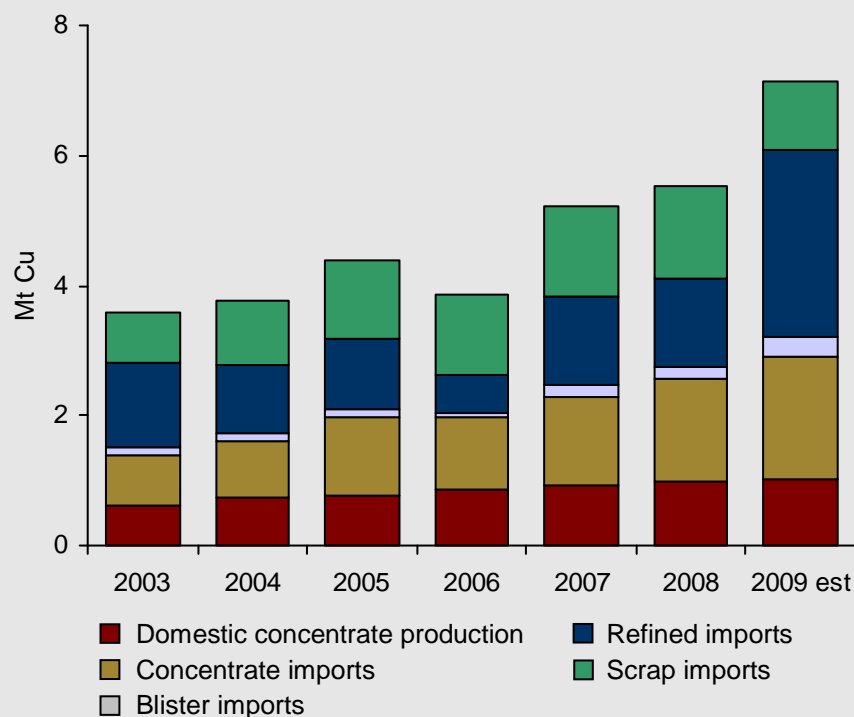


- Industrialisation and urbanisation of a population of 1.35bn
- Continued robust growth expected:
  - Infrastructure and construction very copper intensive (power cable, transformers & building wire)
  - Consumerisation (consumer durables, autos, electronics)
- Per capita copper consumption < 4 kg is still half that of advanced economies in the US, Japan and Europe
- Rising per capita consumption and large population will sustain growth for many years

Source: Copyright Brook Hunt, a Wood Mackenzie Company

## China relies heavily on imports to satisfy its growing demand for copper

### Net Chinese Imports of Copper Materials

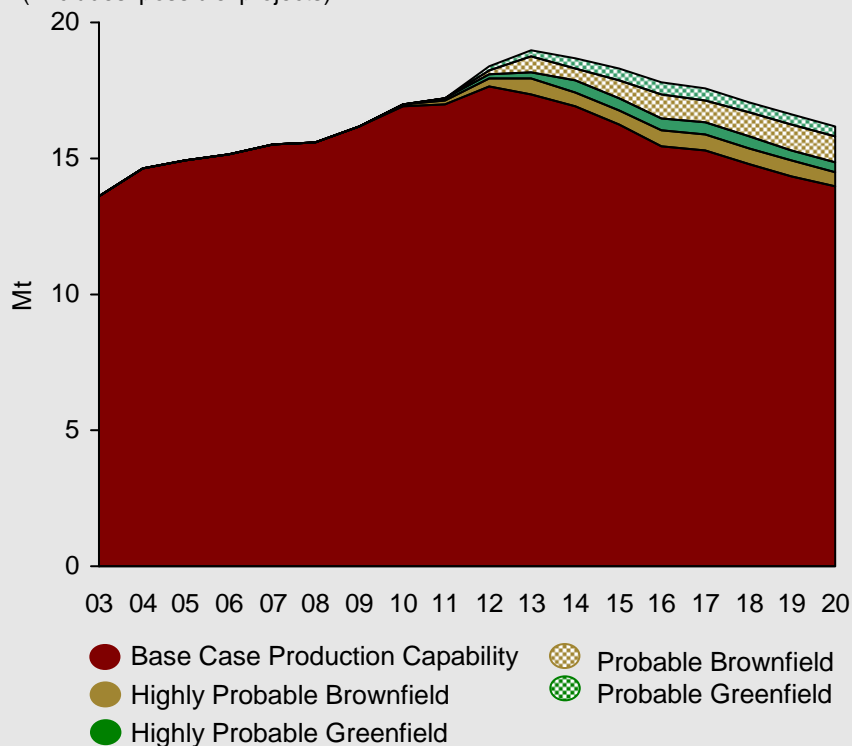


- China is not well endowed with copper resources
- In particular, the need for concentrate to feed its rapidly expanding smelter sector will become more acute over the next 10 years
- China has overtaken Japan as the largest copper concentrate importer and will progressively dominate the custom smelter market

## Supply side challenges still present, with major mines reaching maturity; the next generation of greenfield projects faces different challenges

### Global Copper Mine Production

(Excludes 'possible' projects)

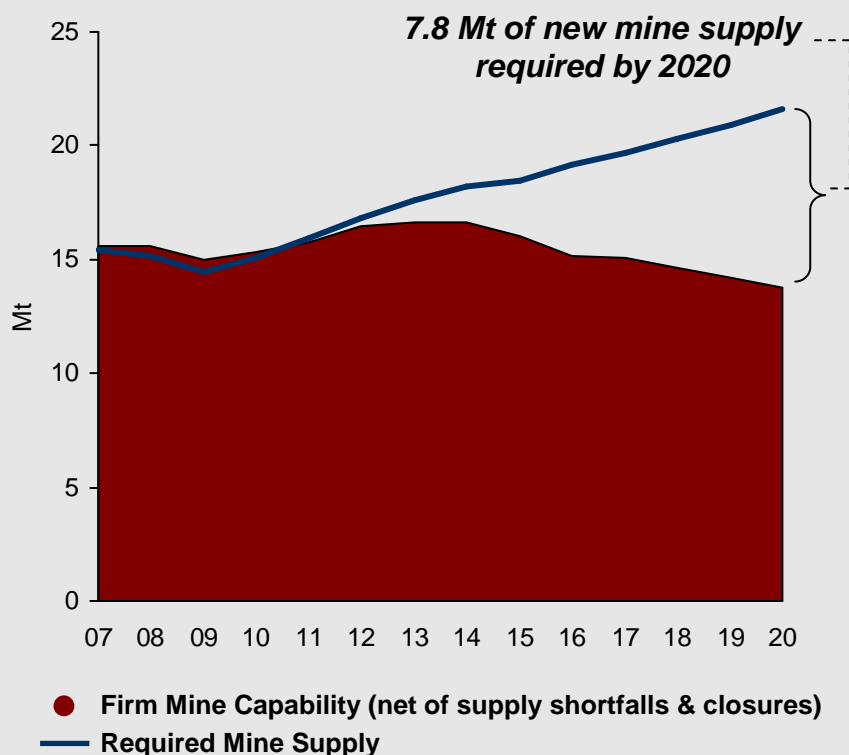


Source: Copyright Brook Hunt, a Wood Mackenzie Company

- Existing operations have underperformed by 0.9 to 1.3Mtpa of mined copper over the last 5 years, largely due to technical issues such as equipment failures, metallurgical problems, weather related issues and slow project ramp-up
- Declining grades and reducing mine lives are expected to reduce existing capacity
- Lower prices, higher operating and capital costs, and reduced availability of funding are contributing to the deferral of development projects
- Quality of new potential copper projects is mixed, challenges include lower grade, environmental restriction (particularly water availability), technological risks and capital intensity

## The copper market remains very attractive due to expected demand growth and supply side challenges

### ABM Copper Supply Demand Outlook



Source: ABM Analysis

- The combination of strong demand growth and declining existing supply results in a requirement for new mine capacity of almost 8 Mtpa by 2020
- This requirement for new projects is onerous and the copper industry will be hard pushed to deliver the capacity required, particularly over the short to medium-term
- This is compounded by:
  - The declining quality of new mine projects
  - New projects are increasingly in countries with heightened political risk
  - Environmental permitting is becoming more stringent
- Copper prices will have to be sufficiently high to incentivise the large amount of new project development necessary

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## Delivering on the strategy

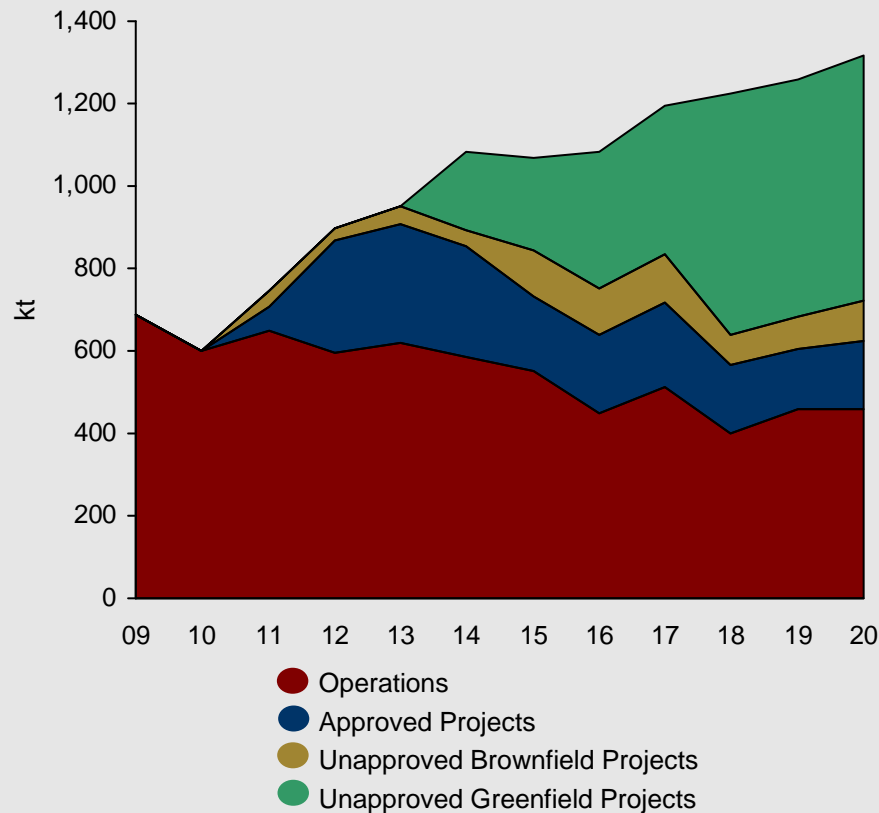
- Copper continues to be a very attractive industry
  - Long term outlook is positive
  - Limited sources of new supply
  - Attractive historical industry returns
- Anglo's strategy is to actively invest in high-quality assets to unlock the full potential of the portfolio
  - Potential to double Anglo's copper production to 1.3 Mtpa by 2017

# Copper in Anglo Base Metals Portfolio



**Anglo American's copper production has the potential to double to 1.3 million tonnes per year by 2017**

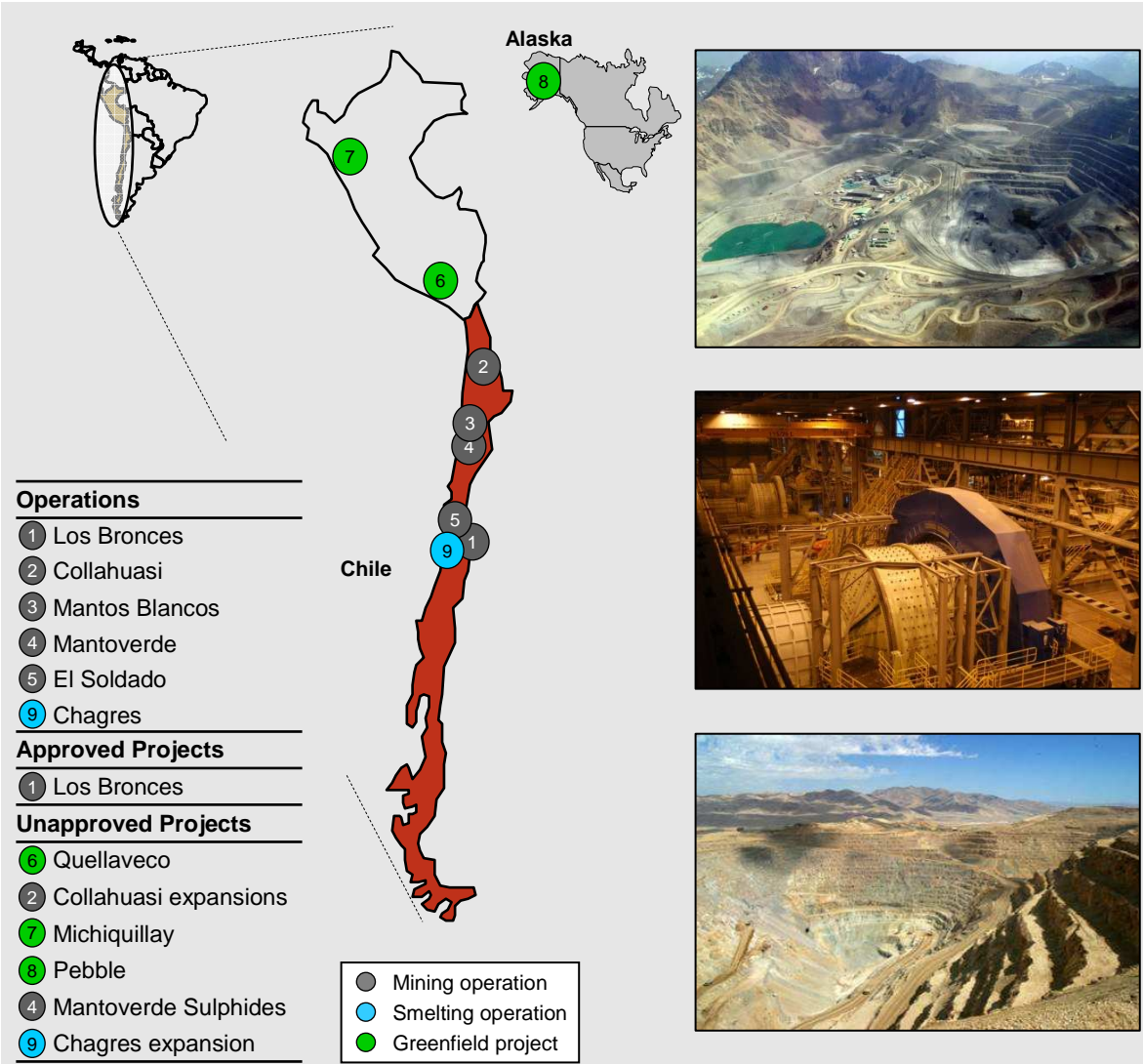
**Attributable Contained Copper Production**



Source: Anglo American

- Growth projects, particularly Los Bronces, are well-timed to benefit from expected cyclical recovery and will enhance Anglo American's cost positioning
- Longer term growth options and unapproved projects comprise a balance of brownfield expansions at existing operations and greenfield opportunities, such as Quellaveco and Michiquillay

# Current Portfolio (1/3)



## Los Bronces (100%)

- Open pit Cu mine in Central Chile producing concentrate and cathodes
- Production 236kt Cu, 2.6kt Mo in 2008
- Mine life >30 years
- Significant exploration upside at San Enrique and Los Sulfatos



## Collahuasi (44%)

- Open pit Cu mine in Northern Chile producing concentrate and cathodes
- Production 464kt (204kt) Cu, 2.5kt (1.1kt) Mo in 2008
- Mine life >30 years
- Potential for further expansions



## Mantos Blancos (100%)

- Open pit Cu mine in Northern Chile producing concentrate and cathodes
- Production 86kt Cu in 2008
- Mine life 7 years with potential for extension

# Current Portfolio (2/3)



**Operations**

- ① Los Bronces
- ② Collahuasi
- ③ Mantos Blancos
- ④ Mantoverde
- ⑤ El Soldado
- ⑨ Chagres

**Approved Projects**

- ① Los Bronces

**Unapproved Projects**

- ⑥ Quellaveco
- ② Collahuasi expansions
- ⑦ Michiquillay
- ⑧ Pebble
- ④ Mantoverde Sulphides
- ⑨ Chagres expansion

● Mining operation  
● Smelting operation  
● Greenfield project

**Mantoverde (100%)**

- Open pit, heap leach Cu mine in Northern Chile
- Production 63kt Cu in 2008
- Mantoverde sulphide ore life extension pre-feasibility study currently underway

**El Soldado (100%)**

- Open pit and underground Cu mine in Central Chile
- Production 50kt Cu in 2008
- Mine life has been extended to 15 years, which will impact performance for remainder of 2009 and into 2010

**Chagres (100%)**

- Cu smelter in central Chile, primarily treating concentrate from Los Bronces and El Soldado
- Production 146kt anodes/blisters in 2008, plus 487kt H<sub>2</sub>SO<sub>4</sub>
- Potential to expand production

**Alaska**

⑧

**Chile**

⑦

⑥

②

③

④

⑤

⑨

①

# Current Portfolio (3/3)



**Operations**

- ① Los Bronces
- ② Collahuasi
- ③ Mantos Blancos
- ④ Mantoverde
- ⑤ El Soldado
- ⑨ Chagres

**Approved Projects**

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- Mining operation
- Smelting operation
- Greenfield project

**Quellaveco (81.9%)**

- Production of ~175ktpa Cu over 28-year mine life
- Feasibility study in final stages, on track for completion in early 2010
- Expected to operate in the lower half of the cost curve

**Michiquillay (100%)**

- Agreement reached with local communities in June 2008
- Exploration and conceptual studies underway
- Potential for production of >300ktpa Cu with Au, Mo & Ag by-products

**Pebble (50%)**

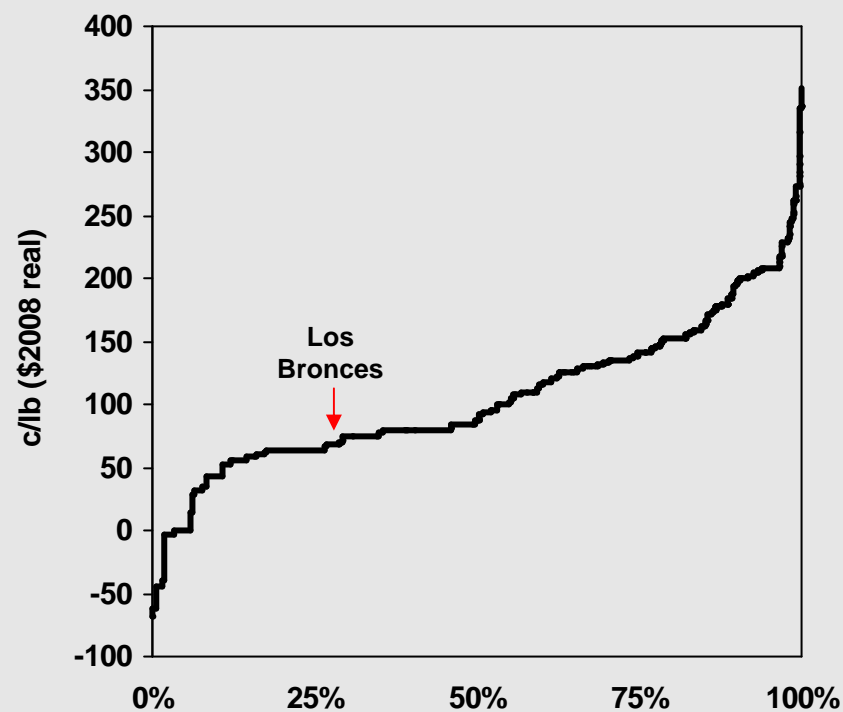
- PFS on target for completion in 2010
- Environmental issues remain a focus
- Funding structure provides optionality - acquisition cost funds project capital
- Potential for production of 350ktpa Cu with Au & Mo by-products

# Copper Positioning



- Two-thirds of existing production in lower half of cost curve
- Weighted average C1 costs for copper portfolio around the middle of the cost curve
- Expansions at Los Bronces and Collahuasi, together with the greenfield pipeline, will improve Anglo's cost position

## 2008 Cost Curve



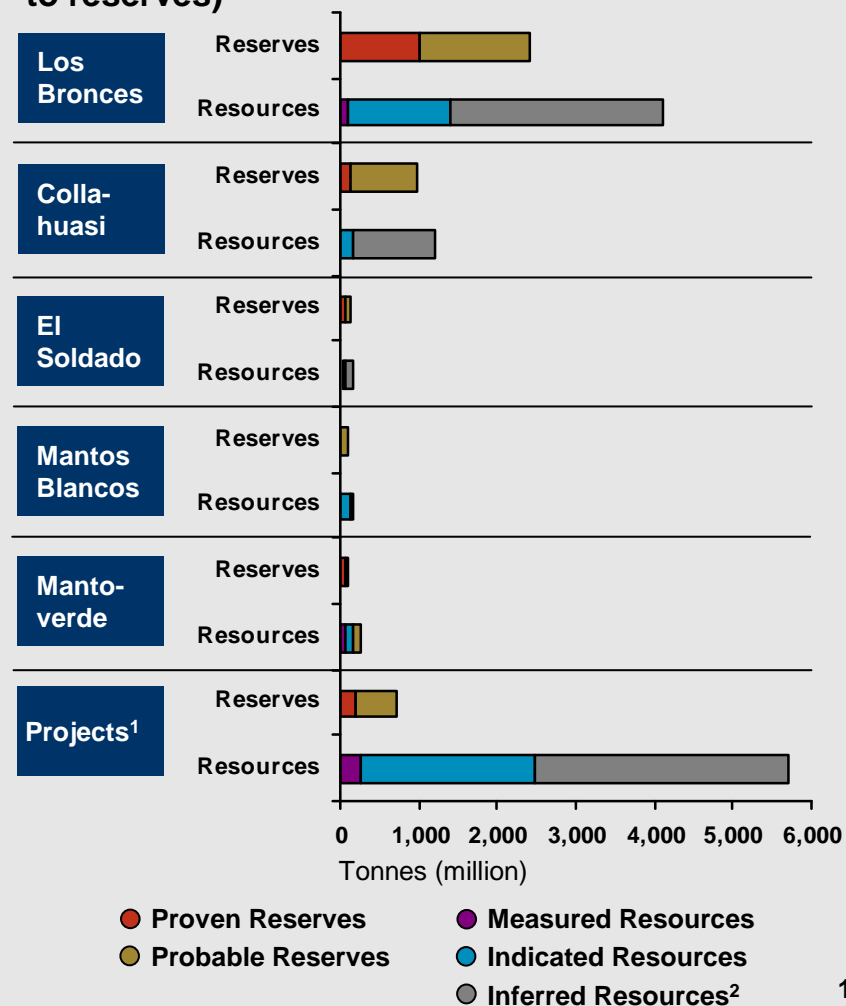
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# Copper Reserves & Resources



- Growth in the short term will be realised from brownfield expansions at Los Bronces and Collahuasi,
- In the longer term, projects in Chile, Peru, and Alaska will shape the copper portfolio – low-cost, long-life assets
- Resource definition drilling is underway at the Michiquillay Project in Peru, and is expected to result in a significant addition to resources

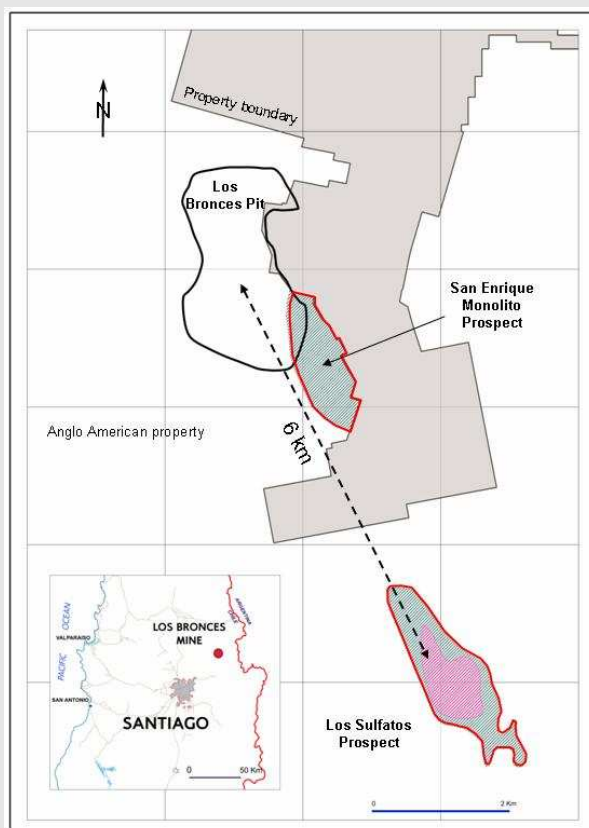
## Attributable Reserves & Resources (in addition to reserves)



1) Projects include Pebble, Quellaveco, San Enrique Monolito and Los Sulfatos  
 2) Inferred Resources includes resources outside the mine plan

# Major New Resources Discovered

## New high grade, world class deposits confirmed at Los Bronces



### Los Bronces

- Located in a premier copper region, well positioned to exploit one of the world's great mineral endowments
- Existing Reserves of 2.4 Bt at 0.51% Cu (12.2 Mt of contained Cu)<sup>(1)</sup> support a 30 year mine life
- Resources additional to reserves of 4.1 Bt at 0.39% Cu (16.1 Mt of contained Cu)<sup>(1)</sup>

### San Enrique Monolito

- Immediately South South East of the Los Bronces pit
- Inferred Resource estimated at 900Mt at 0.81% Cu **(7.2Mt of contained Cu)<sup>(2)</sup>**
- Current block model below the current resources shell indicates that the exploration target could contain 2.5 – 3.5 Bt at 0.65 – 0.75% Cu<sup>(2)</sup>
- Mineralisation remains open laterally and vertically, with 56 km of drilling proposed for 2010

### Los Sulfatos

- 6km South South East of the Los Bronces pit, part of the wider copper system
- 22km of drilling completed, 8km exploration tunnel underway
- Inferred Resource estimated at 1.2 Bt at 1.46% Cu **(17.5Mt of contained Cu)<sup>(2)</sup>**
- Deposit open in various directions, with overall potential for the exploration target expected to be 4 – 5 Bt at 0.8 – 1.0% Cu <sup>(2)</sup>

Note 1: Anglo American Annual Report, 2008 – Resources includes Measured, Indicated, and Inferred

Note 2: Please refer to press releases dated 31<sup>st</sup> July 2009

# Major New Resources Discovered

## Los Sulfatos Exploration Tunnel

- Development of 8km exploration tunnel using Tunnel Boring Machine (TBM) technology to provide future exploration & resource drilling access to Los Sulfatos
- Project initiated in 2008 with an estimated cost of \$77M
- TBM commenced excavating in August 2009
- Tunnel development due to complete in 2011 (4,800m advance planned for 2010)
- Underground drilling (~100,000m), aimed at completing a Conceptual & PFS by the end of 2013

Tunnel Boring Machine



Tunnel Entrance



Chalcopyrite breccia



Bornite-rich mineralization



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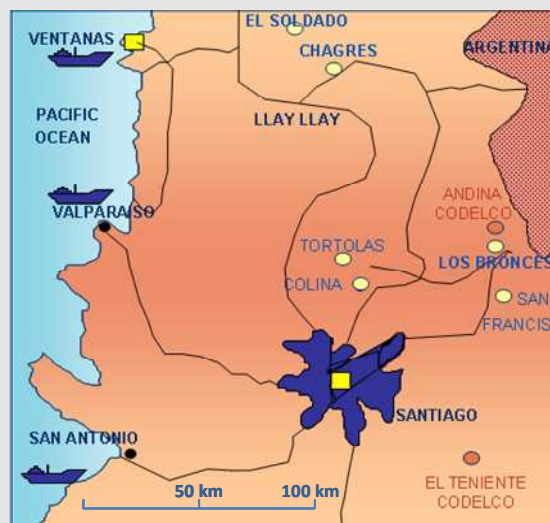
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## Los Bronces Location



- Los Bronces is located in the Andean Mountains at 3,500masl, ~65km north-east of Santiago
- A 56 km pipeline runs from the Los Bronces grinding plant site to the flotation facility at Las Tórtolas
- Las Tórtolas is located in the Colina valley, ~40km north of Santiago

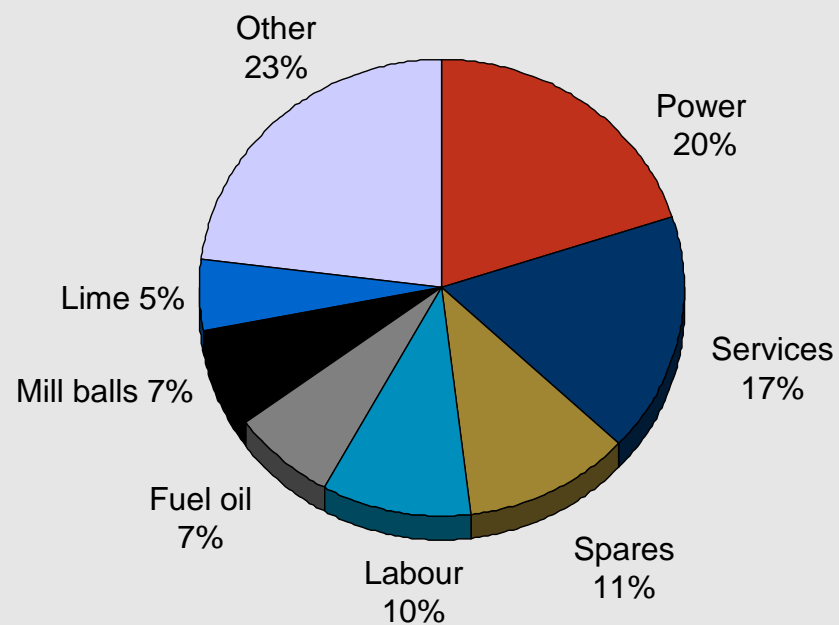
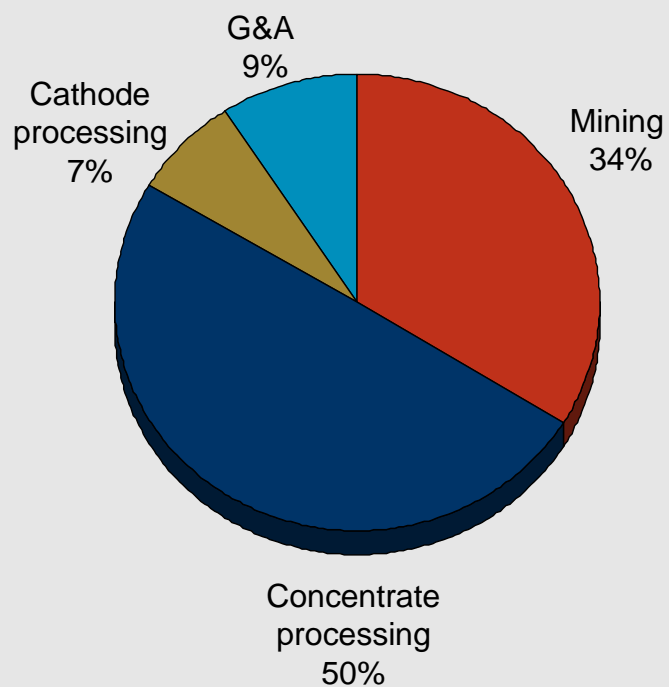
## Project History

- 2002: Anglo acquires Disputada from Exxon Mobil for \$1.3Bn, adding Los Bronces division to its portfolio
  - US \$6.5Bn in EBITDA generated since acquisition
  - Payback period of 3 years
- 2002: Expansion project began, to increase processing to 54kt per day
- 2007: Anglo announced the Los Bronces Development Project

## Los Bronces – poised to become the 5<sup>th</sup> largest copper mine in the world

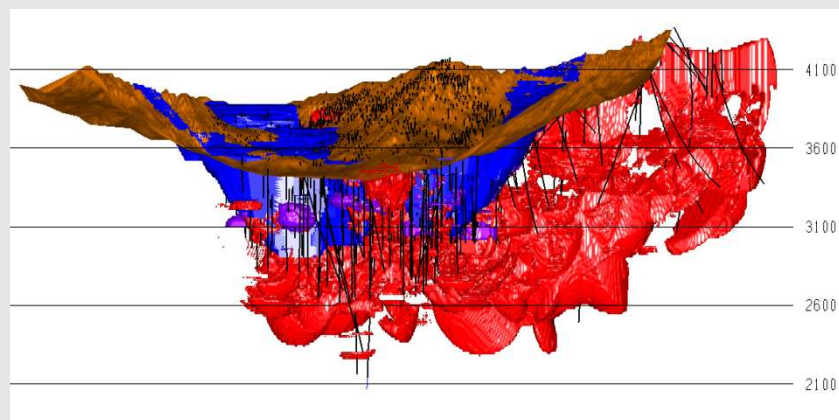
Mineral Resources	Reserves – Sulphide: 1.6Bt @ 0.63%, Leach: 0.8Bt @ 0.26% Resources – Sulphide: 4.1Bt @ 0.4% (in addition to reserves)
Processing Technology	Grinding plant to treat sulphide ore 141ktpd and two electro-winning plants for the low-grade dump leaching process
Start-Up	Fourth quarter 2011, reaching full production in 2012
Production Profile	<ul style="list-style-type: none"> <li>• Expansion: 276ktpa contained Cu over first 3 years, 206ktpa averaged over first 10 years</li> <li>• Existing operation: 234ktpa Cu, averaged over last 2 years</li> <li>• Total production: 490ktpa contained Cu over first 3 years, 415ktpa averaged over first 10 years, plus 5.4ktpa Mo</li> </ul>
Capital Expenditure	USD 2.4 billion
C1 Operating Costs	USD 0.70/lb (\$2009) - average over first 10 years after expansion

## Controllable Operating Costs USD 0.59/lb



Notes: Controllable operating costs (CO) averaged over the first 10 years of production

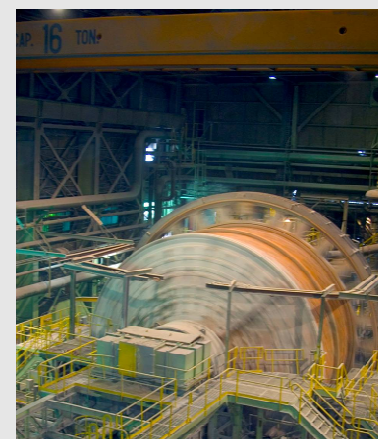
## Geology



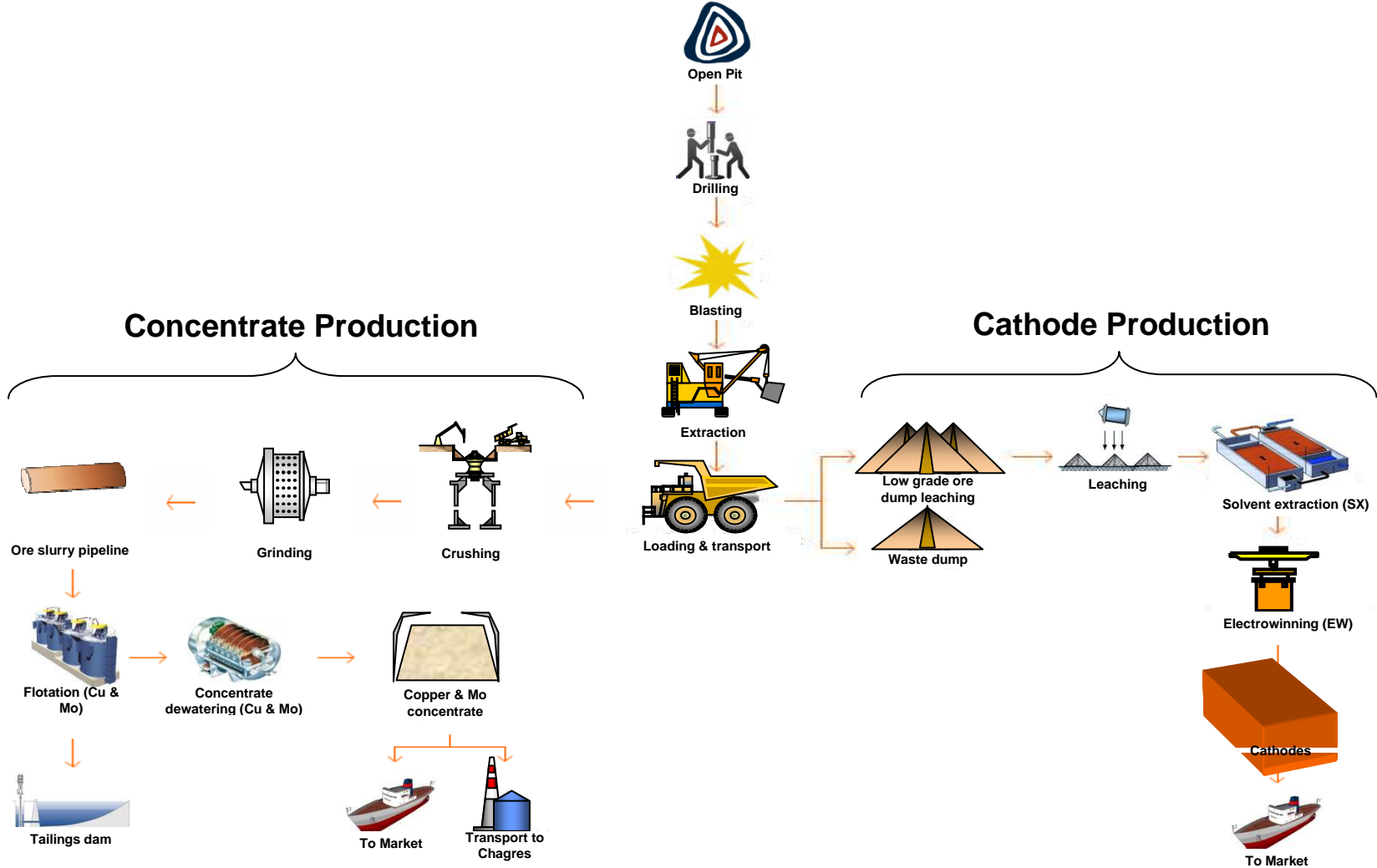
- Porphyry cluster adjacent to Codelco's Andina operations
- Chalcopyrite-bornite primary sulphides overlain by a thick chalcocite blanket
- Deep and lateral extensions of ore body still open

## Technology

- Primary crushing: One 60"x89" 750kWh unit
- Grinding plant: One 40 ft SAG mill and two 26 ft ball mills
- Ore slurry transport: New 52km pipeline alongside the existing one
- Flotation: New Cu and Mo flotation plants at Las Tórtolas



# Los Bronces Process Flow



## Project Facts

- Mineral rights 100% owned by Anglo American
- Expansion of an existing operation, using proven technology
- All heavy equipment on site by early 2010
- Electrical power supply contract in place
- At site
  - 140,000 m<sup>3</sup> of concrete
  - 23,000 tonnes of steel structures
  - 37,000 tonnes of steel pipes
  - 1,380 km of electrical cables

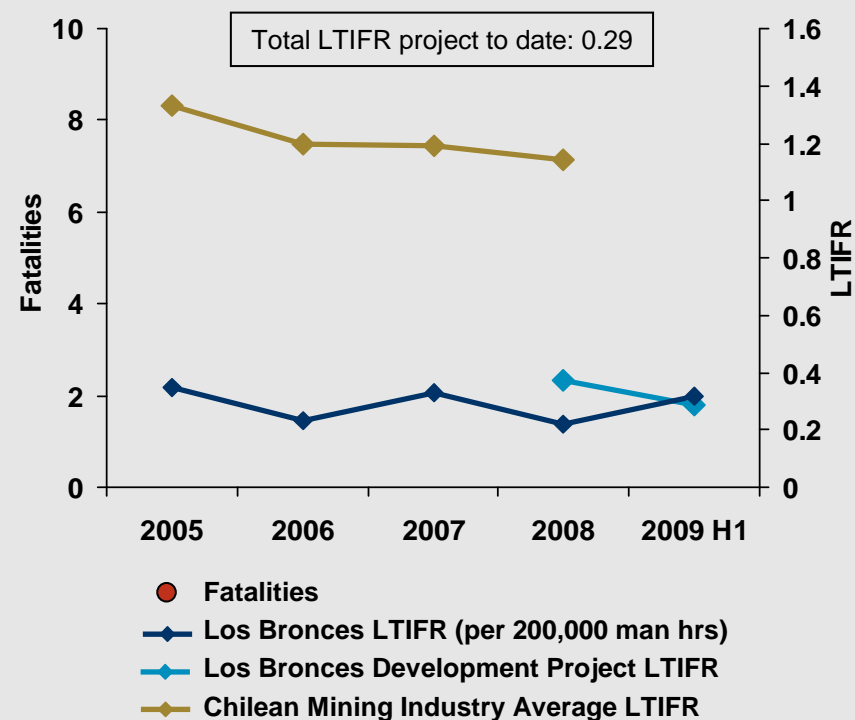
## Operating Facts

- 52 million tonnes of dry ore treated at the plant per annum
- 415k tonnes of Cu produced on average over the first 10 years
- LOM >30 years
- Annual consumption of 1.5 million MWh electrical power
- About 90% of incremental copper with sales contracts in place or in development

## Safety is our number 1 priority

- Exceptional project safety performance to date
  - No fatalities since start of project (7.4 million man hours)
  - LTIFR significantly below Chilean industry benchmarks
- Project team is fully committed to the Anglo American Safety Principles

### Los Bronces Safety Performance



## Rigorous environmental standards and policies have been applied

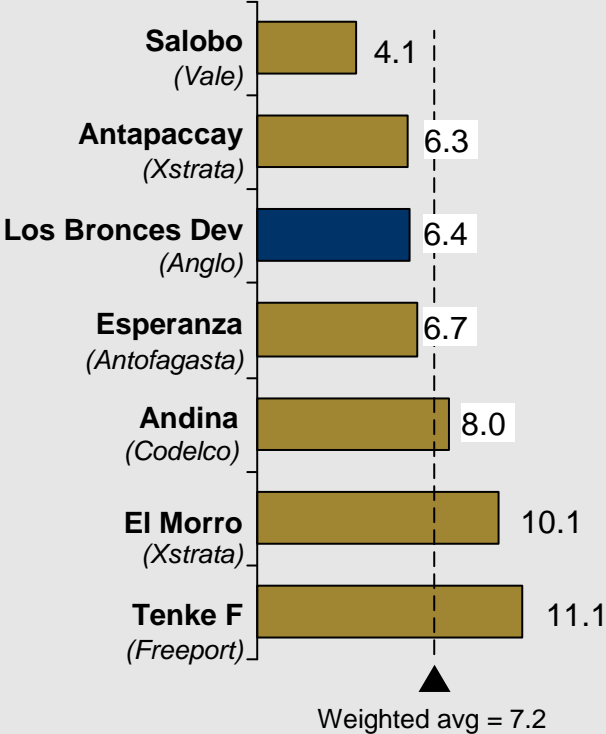
- Environment Impact Assessment was approved in 2007 and requirements incorporated into project design
- Numerous minor local permits in progress and being actively managed by Anglo team
- Environmental professionals included in Owners team and major contractors team to monitor compliance
- Key environmental considerations include
  - Reduced energy consumption (31kwh/t vs. 36kwh/t)
  - Significant reduction in fresh water use (0.57m<sup>3</sup>/tt vs. 0.98m<sup>3</sup>/tt)
  - Testing of technology to treat surplus water for irrigation of neighboring tree farm underway
    - a plant to treat 150l/s expected to be in operation by 2011
  - Upgrading of the public road to improve safety for all users

# Project Performance – Capital Discipline (1/2)



## Capital intensity is in line with industry benchmarks

### Capital Intensity<sup>1</sup> of Copper Projects (USD/lb Cu)



- Resulting capital intensity of USD6.4/lb is lower than the weighted average for comparable projects

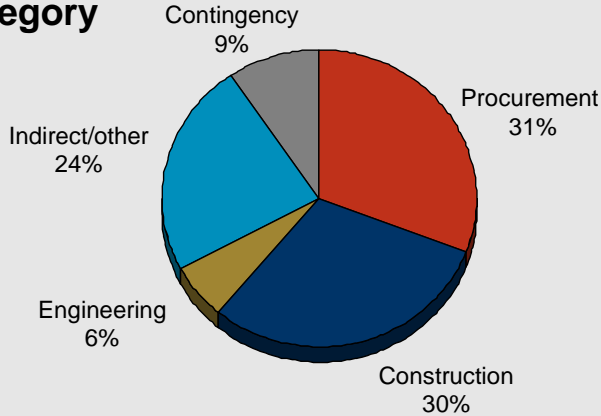
(1) Capital Intensity = Estimated capex / average annual copper production.  
(2) Los Bronces number based on \$2.4Bn capex  
Source: Brook Hunt, Company Reports, Internal Analysis

# Project Performance – Capital Discipline (2/2)



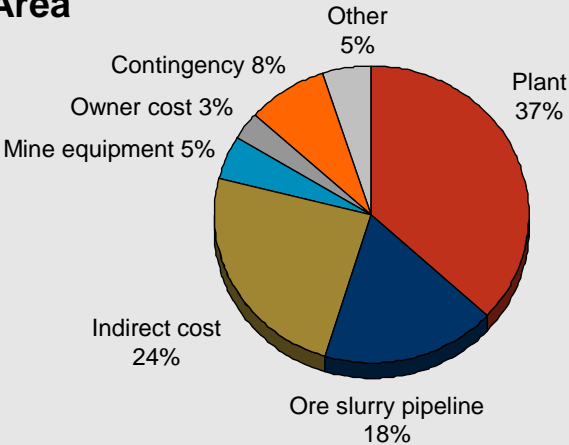
## Forecast capital cost \$2.4Bn

### Spend by Category



- Total spend to date \$778M
- 2009 YTD spend \$428M
- Remaining 2009 spend \$199M
- 2010 forecast spend \$800 - 1,000M
- Total budget \$2,408M

### Spend by Area



## Execution risk management

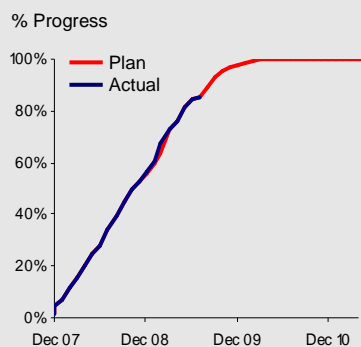
- Design development through gated process concept: pre-feasibility; feasibility; basic engineering; and now in execution phase
- EPC Contractor Bechtel provides lowest risk delivery options and was also involved in earlier phases, ensuring maximum certainty in delivery phase with no “re-learning”
- Proven familiar equipment – certainty of technology
- Other project scope managed directly by Anglo where there are synergies
  - HV Power Line
  - New access tunnel for ore conveyor
  - Upgrade of existing crushing facilities adjacent to current operating facilities
- Experienced Owners team providing overview and coordination role
- Engineering 82% complete and is planned to be substantially complete by November 2009
- Procurement of all long lead and high value equipment complete and majority on site this year
- Activities for detailed planning and execution of startup underway to ensure 100% operational readiness

# Project Performance – Project Execution (2/2)



**Overall project progress at 18% in August 2009, in line with plan**

## Engineering



Plan	83%
August 09	82%

## Procurement



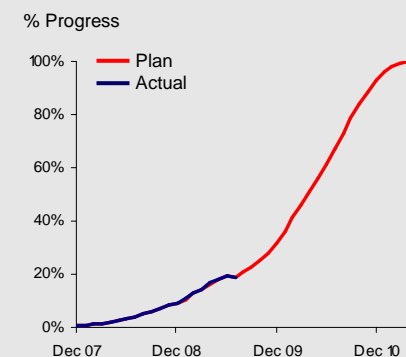
Plan	48%
August 09	48%

## Construction



Plan	15%
August 09	15%

## OVERALL



Plan	18%
August 09	18%

## Clear commissioning plan in place to ensure operational success

- Integrated Risk Management – Group approach to Risk Management
  - Identification, evaluation, rating
  - Development of strategies
  - Risk registers
- Commissioning plan with clear roles and responsibilities to ensure a safe and effective hand-over process
- ORP – Operational Readiness Plans in place
- Project and operational teams working together
- Familiar equipment
- Experienced operations team drawn from existing facility
- No new or unique technology
- All purchase orders for long-lead time spares placed

## Key messages from today's visit

- 1** Successful execution of large scale, brownfield project with world-class safety performance
- 2** Low operating costs and risk – proven operating expertise, supported by Anglo group functions
- 3** Major resource base with significant exploration upside
- 4** Delivery on growth strategy with long life, lost cost production in attractive commodity markets

# Questions and Answers



# Site Visit Overview

- Safety & PPE distribution
- Donoso
- Tunel Sur
- Confluencia
- Grinding Plant

**Confluencia**



**SAG & Ball Mill Foundations at Confluencia**



**Tunnel to Confluencia**

