

Agenda



CODELCO'S OPERATIONS

- Ministro Hales & Chuquicamata



CODELCO ACHIEVING ITS GOALS

- Treating and Marketing Complex Cucons

GLOBAL BLENDING CAPACITY

- Enough capacity worldwide



SOLUTIONS

- MH Roaster
- Ecometales

CONCENTRATES MARKET OUTLOOK

- Top Players
- Supply & Demand



FUTURE CHALLENGES

- Leading the way for treating complex materials

1 CODELCO'S OPERATIONS

MINISTRO HALES AND CHUQUICAMATA UNDERGROUND



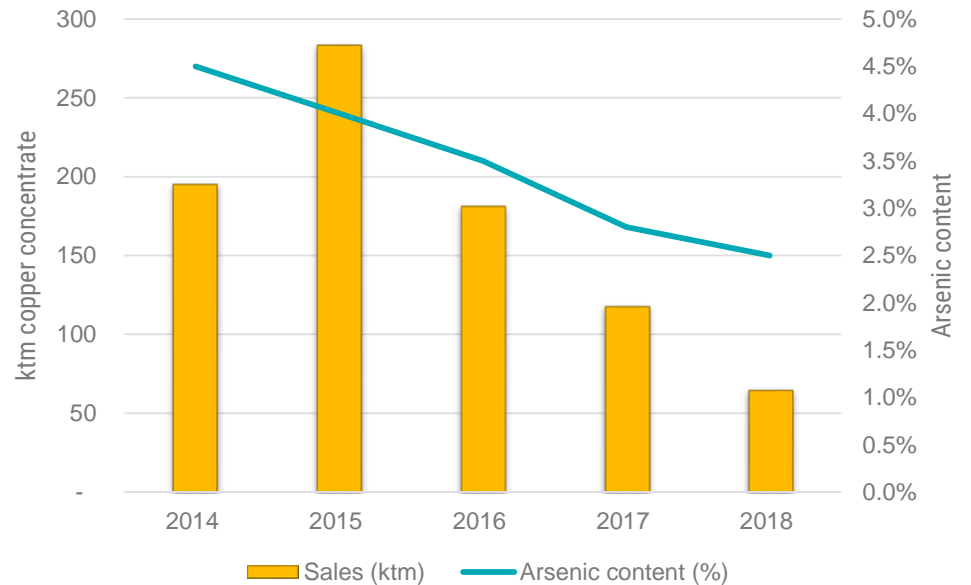
- ▶ DMH, Codelco's most recent project development started in November 2013. It will produce over 9 millions tones of copper concentrates.
- ▶ Chuquicamata Underground is a project over a 40 year mine life. The operation will deliver app. 41 million tones of copper concentrate.
- ▶ Each ore contains a significant amount of arsenic (above the 0,5% arsenic level).

2 CODELCO ACHIEVING ITS GOALS



- DMH production started in 2014, however, Roaster began its operation a year later.
- During Roaster ramp up we focused mainly on:
 - **Blending**
 - Marketing of high As concentrate (to key smelters)
- Blending was a **short term** solution while Roaster achieved its nominal capacity.

DMH Copper Concentrate Sales 2014 - 2018

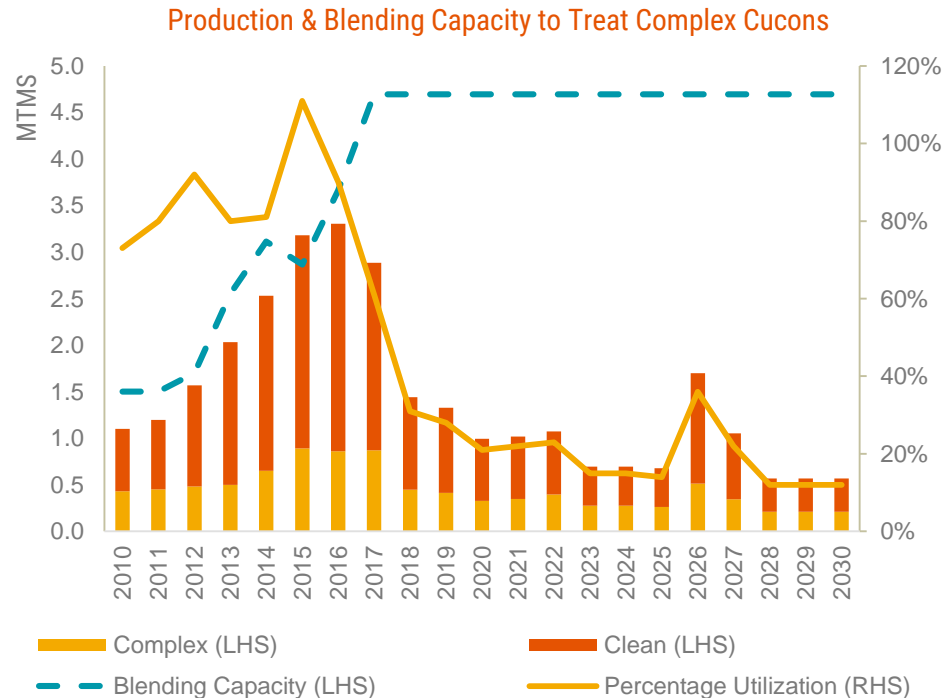


Source: Codelco

3 GLOBAL BLENDING CAPACITY



- As of 2010 the global capacity to handle blending outgrows the production of complex concentrates. Thus there is no shortage of worldwide blending facilities.



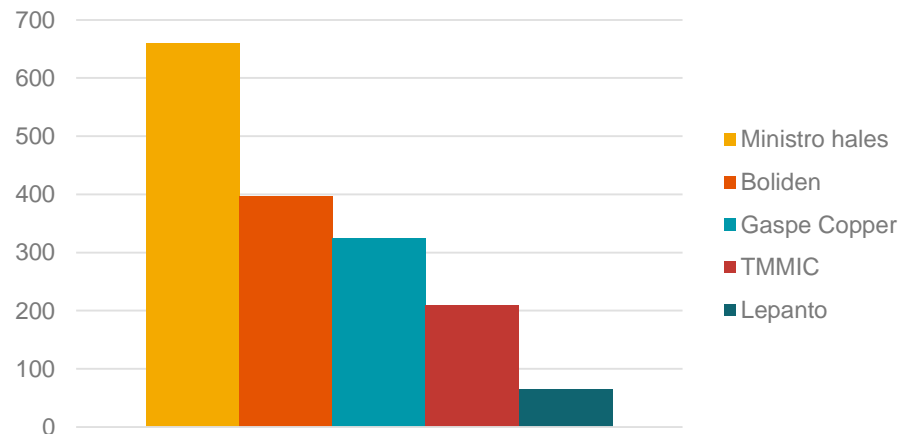
Source: Wood Mackenzie

4 HOW CODELCO HANDLES HIGH ARSENIC



- **DMH ROASTER IS THE LARGEST IN THE WORLD**

Annual Treatment Roasting Capacity (kdmt)



Source: Codelco

- DMH Roaster, which is the largest roasting facility in the world, has the technical solution to treat high arsenic concentrates **efficiently**.
- Copper Concentrate Capacity : Approx. 610kdmt per year.
- Arsenic Capacity : 38ktpy of arsenic.
- **Spare capacity: 23ktpy** of arsenic.

4 HOW CODELCO HANDLES HIGH ARSENIC



- WE CAN MANAGE ARSENIC IN CONCENTRATES

Treatment of complex concentrates at our own smelters:
CHUQUICAMATA and **POTRERILLOS**.

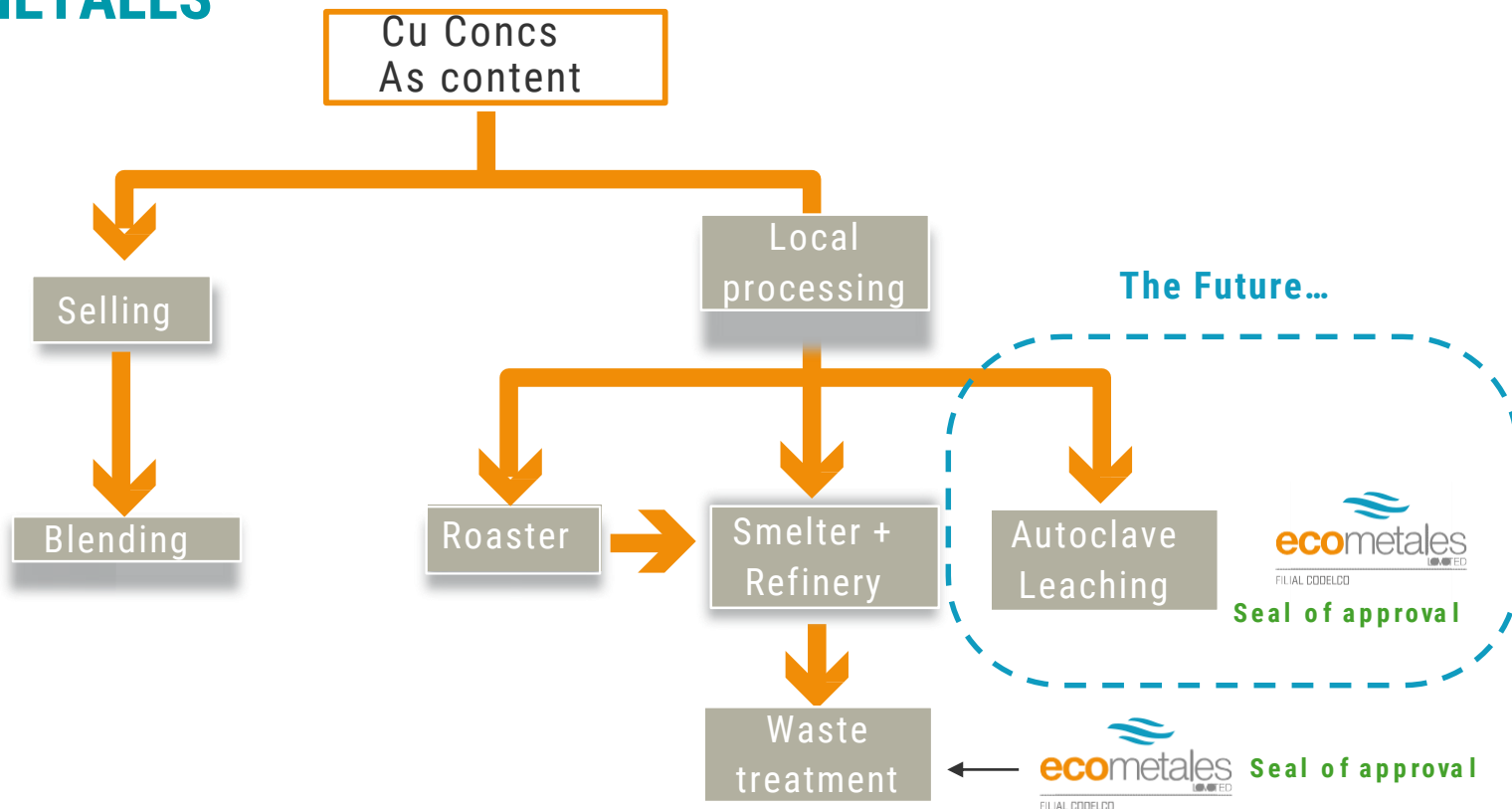
ARSENIC treatment at our smelters generates additional revenue by capturing penalties otherwise paid to the market.

Our subsidiary Ecometales treats high As flue dust.

4 HOW CODELCO HANDLES HIGH ARSENIC



■ ECOMETALES



4 HOW CODELCO HANDLES HIGH ARSENIC



■ ECOMETALES

A flue dust leaching plant followed by a selective arsenic precipitation plant from existing facilities (BioCOP).

• **ECL**, 100% subsidiary of CODELCO, focused on delivering environmental solutions and value recovery for mining residues.

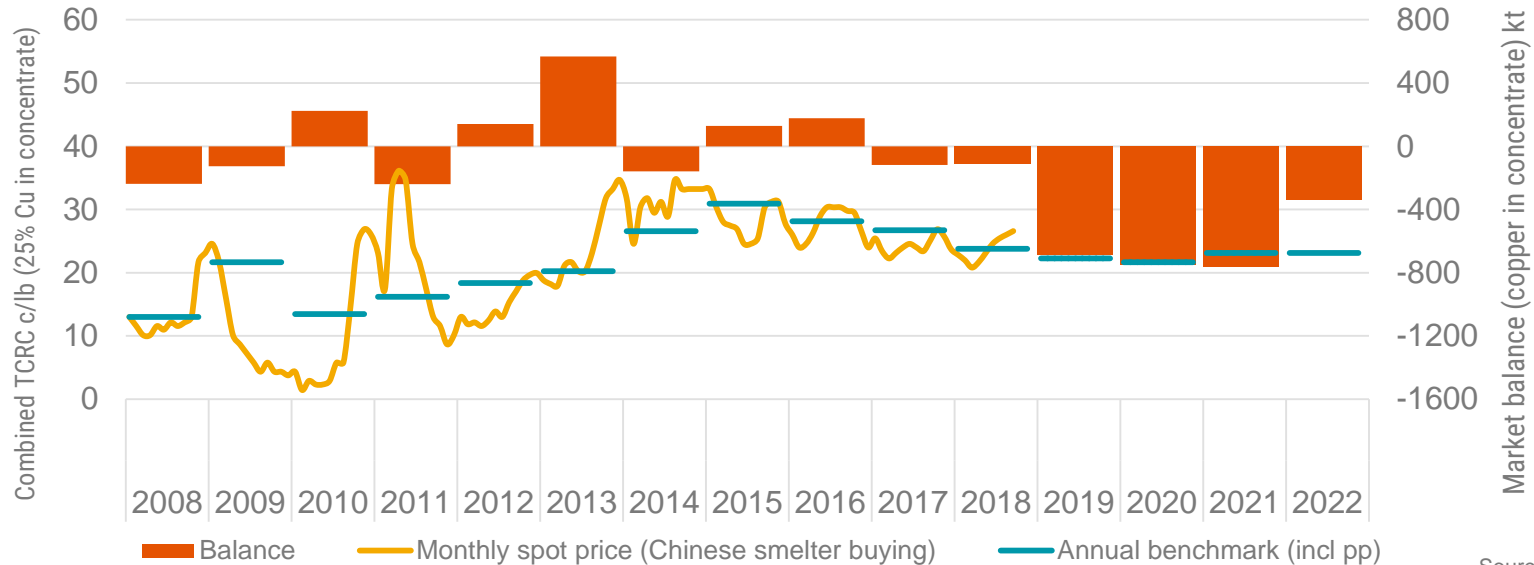
• **ECL** has a total workforce of about 300 people and is supported by 250 environmental permits.

• **ECL** has processed more than 400,000 tons of residues recovering 80,000 tons of copper. Since the start-up of the As stabilization plant, more than 7,500 tons of arsenic have been stabilized.

5 CONCENTRATES MARKET OUTLOOK

■ TREATMENT CAPACITY OUTGROWS SUPPLY

- We expect a significant deficit in the custom market throughout the next three years, reaching c.700kt on average (. The global capacity will continue to outpace the availability of copper concentrates during the coming years.



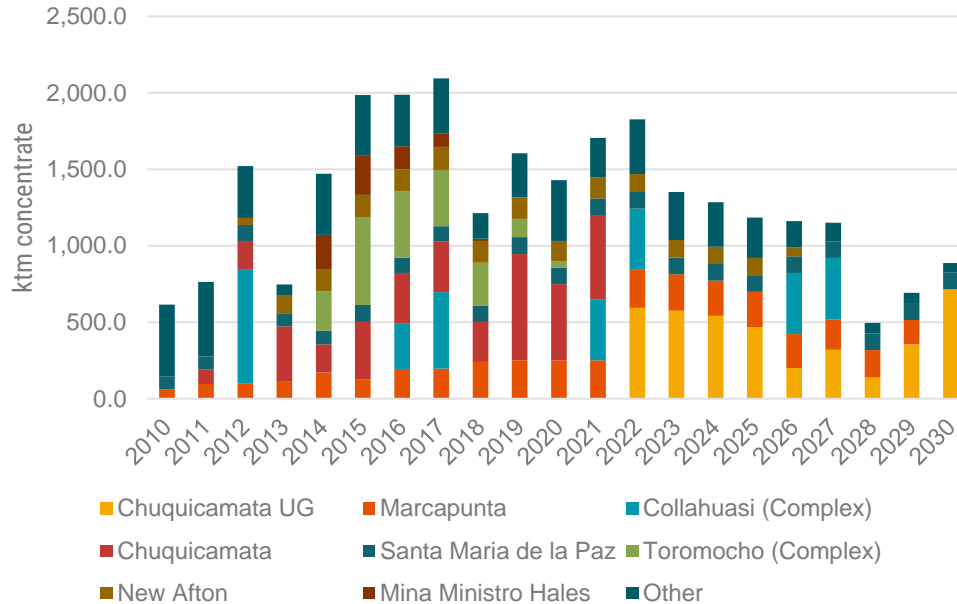
Source: Wood Mackenzie

5 CONCENTRATES MARKET OUTLOOK



■ COMPLEX CONCENTRATES KEY PLAYERS

Complex concentrate supply by company



- Ranked by total concentrate produced

- Chuquicamata Underground
- Marcapunta
- Collahuasi
- Santa Maria de la Paz

are the biggest suppliers in the Custom complex market segment

- Ministro Hales** production is 610ktm of complex concentrates but treated in the Codelco roaster

* Complex concentrate = As >0,5%

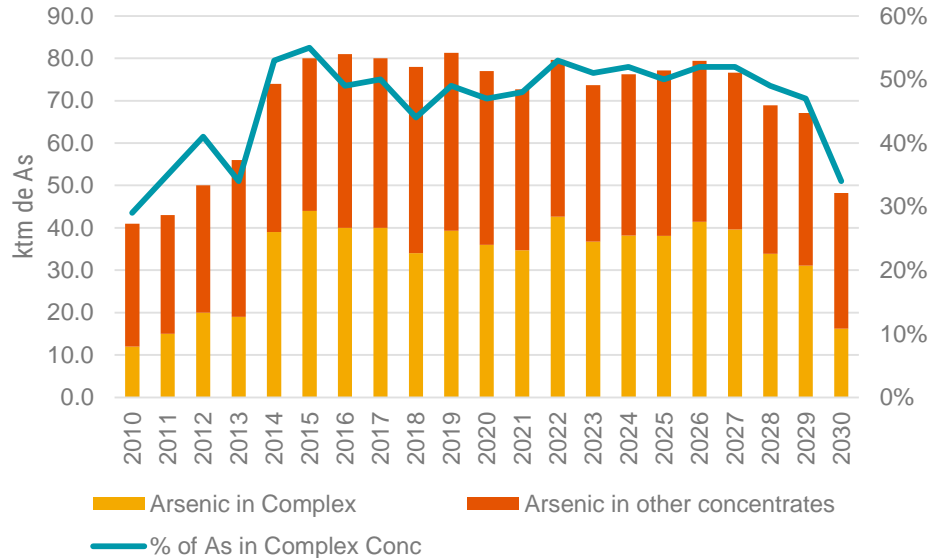
Source: Wood Mackenzie

5 CONCENTRATES MARKET OUTLOOK



■ ARSENIC CONTENT DECLINING

Tones of Arsenic in complex concentrates

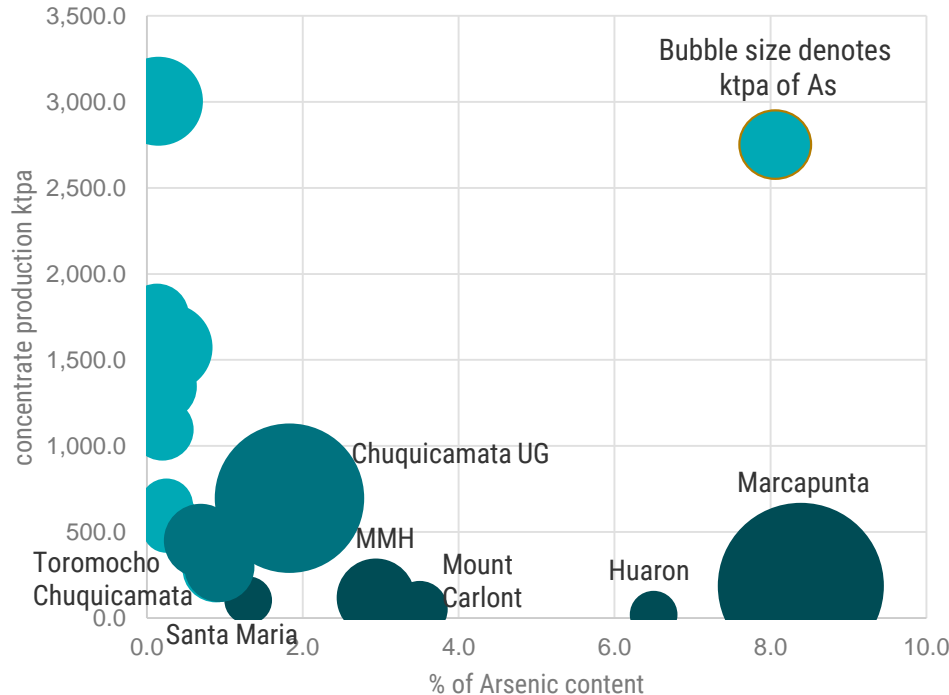


- **35,6 ktons of arsenic** will be the average of production in complex concentrate the coming years, in the Long term will decrease sharply
- The main volume available in the market will be Chuquicamata and Collahuasi, both are in the level of 0,6 – 15% of arsenic content

Source: Wood Mackenzie

5 CONCENTRATES MARKET OUTLOOK

■ COMPLEX CONCENTRATES MARKET SHARE



- High arsenic concentrates (>0.5% As) account for 55% of the complex concentrates market.
- Codelco mines **Chuquicamata Underground and Ministro Hales** account for 7% of the custom market.
- 5 mines, each one producing less than 250ktpa of Cu concentrates, account for 33% of arsenic in the custom market.

Source: Wood Mackenzie

6 FUTURE CHALLENGES

■ LEADING THE WAY TREATING COMPLEX CONCENTRATES

Operational and commercial improvements at our smelters to increase competitiveness.

Become a world leader in the treatment of complex concentrate.

Commercial optimization of spare capacity at DMH roaster and Ecometales

CONCLUSIONS

OUR OPERATIONS

DMH - CHUQUI

- 50 million tonnes of copper concentrates (life of mine).
- High arsenic content.

OUR SOLUTIONS

DMH Roaster

Codelco Smelters

- Largest in the world.
- Benefits of spare capacity.

ECOMETALES

100% subsidiary

- Processed + 400kt of residues.
- Recovering 80kt of copper.

THE FUTURE

Technical & Commercial Efficiency

- World leader in arsenic handling and treatment.

As a world class player for Arsenic treatment, **Codelco** has been able to manage and market complex concentrates globally.