# China Primary Copper Market and Concentrate Pricing Analysis

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# Global Copper Concentrate Sources and Pricing Analysis

## OBJECTIVES

- Client is one of famous global mining companies and would like to build a smelter by itself and need to investigate the channels for importing the copper concentrate,  in the meantime figure out the pricing mechanism.

## PROCESS

- Methodology
  - Analyze global Cu Concentrate Reserve
  - Bottom-up modeling of China Cu Concentrate Demand
  - Conduct in-depth analysis Pricing & Business Mode Introduction
- Sample Size
  - Trader (10), Smelter (10);
  - Mince (45), Complex mixer (16);
- Project Time
  - 6 weeks

## DELIVERABLES

- Global Cu Concentrate Reserve
  - Global Mixing Plant Distribution
  - Detailed Analysis of Non-CIQ Concentrate
- China Cu Concentrate Demand
  - China Smelter Benchmark
  - China smelters' tolerance Analysis for Non-CIQ Copper Concentrate
- Pricing Mechanism Analysis
  - TC / RC pricing method & Coefficient pricing method
  - Deduction and Premium subtracting principles for key element e.g. As, F, Cu, Ag, Cu, etc.
  - Pricing difference within "clean", "Dirty" and "Complex" Cu concentrate

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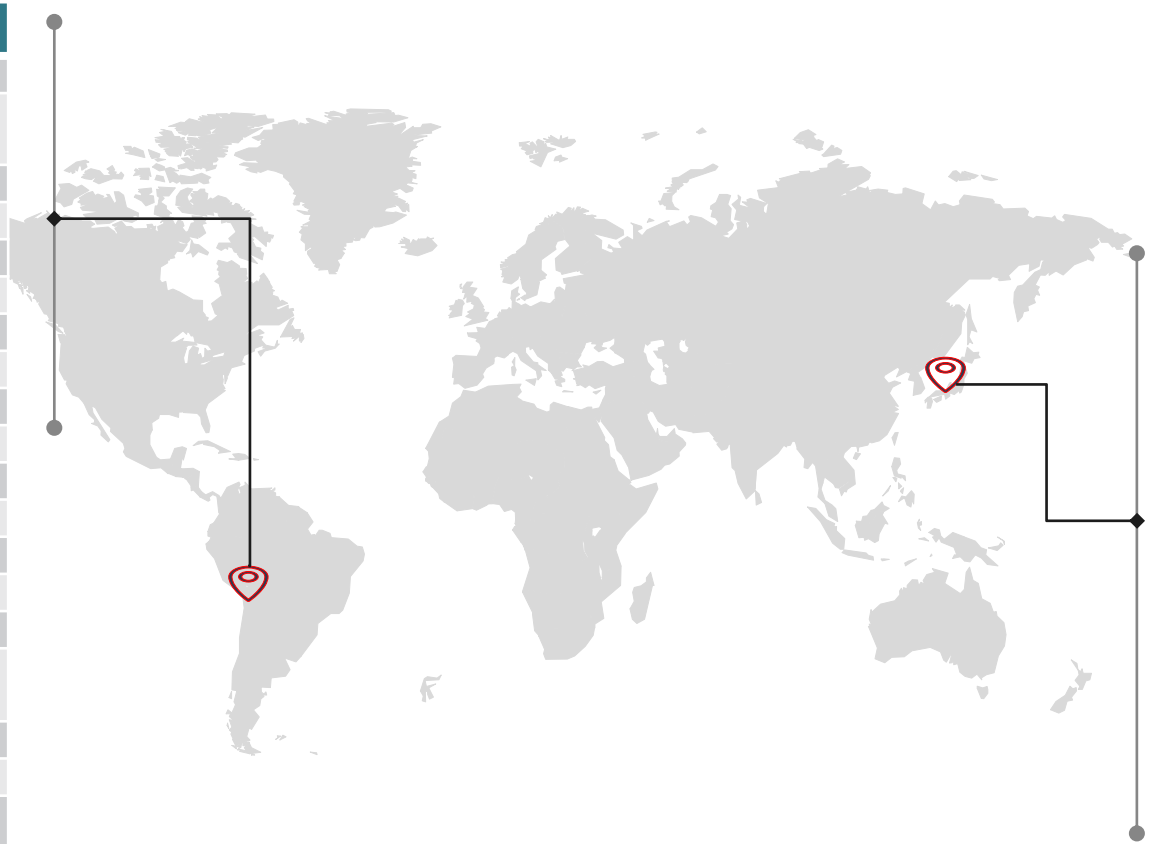
# Transaction flow

*Source: SMM*

# Imported Cu Concentrate Grade

| Toromocho Copper Conc. | | |
|---|---|---|
| Cu | <19-24> | % |
| Ag | <110-250> | g/mt |
| Au | <0.1-1> | g/mt |
| As | <0.5-1> | % |
| Zn | <1-4.5> | % |
| Fe | <22-30> | % |
| S | <25-30> | % |
| Pb | <0.6 | % |
| Sb | <0.15 | % |
| Bi | <400 | ppm |
| Hg | <7 | ppm |
| Ni | <0.1 | % |
| Se | <0.04 | % |
| Cd | <0.02 | % |
| Cl | <0.02 | % |
| F | <1000-1600> | % |
| Al2O3 | <0.5-1.5> | % |
| MgO | <4-8> | % |
| Mn | <0.03-0.1> | % |
| H2O | <9-11> | % |

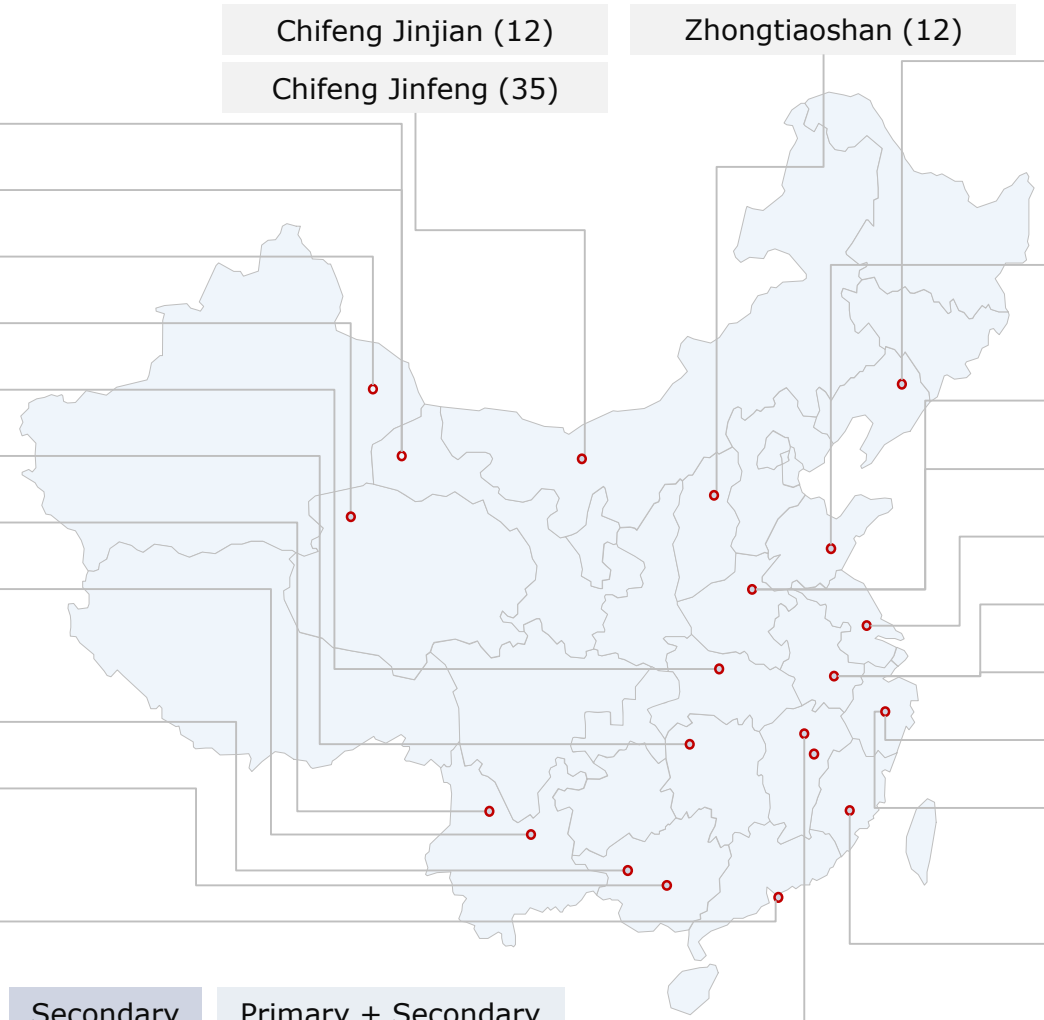


| Chino Copper Conc. | | |
|---|---|---|
| Cu | 22 - 38 | % |
| Au | 1.2 - 2 | g/mt |
| Ag | 24 - 40 | g/mt |
| S | 27 - 36 | % |
| Fe | 25 - 33 | % |
| Al2O3 | 1.0 - 2.20 | % |
| As | <0.005 | % |
| Bi | <0.001 | % |
| CaO | 0.50 - 2.00 | % |
| Cd | 0.01 - 0.02 | % |
| Cl | 0.001 - 0.02 | % |
| F | 50 - 500 | ppm |
| Hg | 0.10 - 0.50 | ppm |
| MgO | 0.20 - 0.50 | % |
| Mo | 0.20 - 0.50 | % |
| Ni | 0.007 - 0.02 | % |
| Pb | 0.050 - 0.20 | % |
| Sb | <0.007 | % |
| Se | 0.01 - 0.05 | ppm |
| SiO2 | 3 - 12 | % |
| Sn | 0.001- 0.015 | % |
| Te | <0.001 | ppm |
| Zn | 0.2 - 0.9 | % |

*Source: SMM*

# Capacity Distribution of Copper Smelter (2018)

*Unit: million tons*



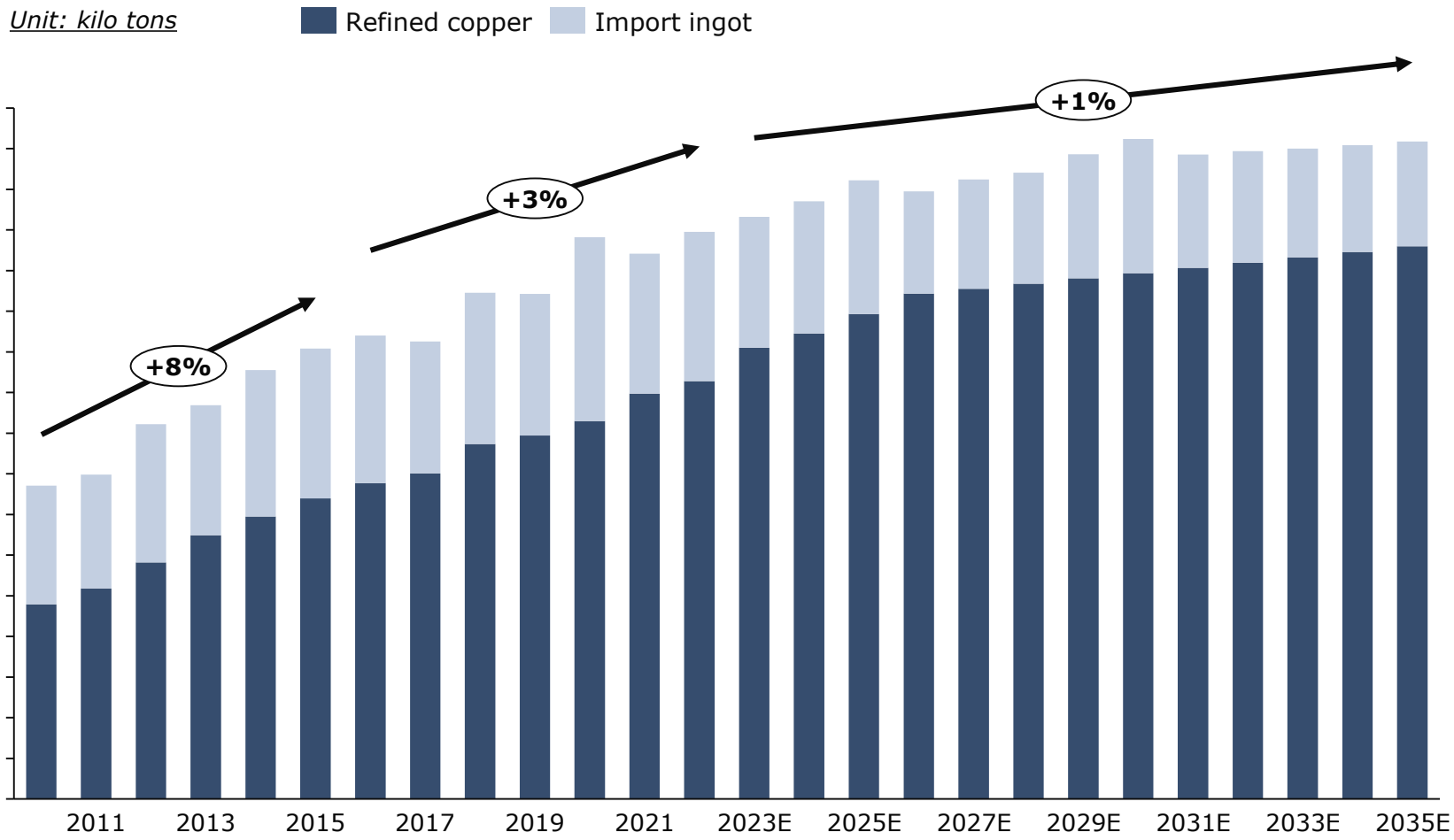
Chifeng Jinjian (12)
Chifeng Jinfeng (35)
Zhongtiaoshan (12)
Jinchuan Group (40)
Silver Non-ferrous (20)
Wuxin Copper (10)
Qinghai Copper (10)
Daye Non-ferrous (60)
Hunan Minmetals (10)
Yunan Copper (50)
Yunnan Tin (10)
Guangxi Jinchuan (40)
Guangxi Nanguo (30)
Wuzhou Jinsheng (30)
Qingyuan Jiangxi (10)
Zhaoqing Feinan (10)
North Copper (15)
Dongying Fangyuan (70)
Xiangguang (50)
Yantai Guorun (12)
Dahai Group (20)
Central Gold (35)
Yuguang Gold/Lead (15)
Zhangjiagang Cu (30)
Anhui Jiinlong (45)
Tongling Jinguang (50)
Zhejaing Fuye (35)
Ningbo Jintian (10)
Ningbo Shimao (10)
Fujian Zijing (32)
Zhonglv Dongnan (40)
Jiangxi Copper (100)
Jiangxi Xinjinye (5)
Jiangxi Zhiyuan (10)
Jiangxi Jinhui (10)
Jiangxi Hefeng (10)
Jiangxi Feinan (10)
Jiangxi Zhongwang (20)
Jiangxi Zili (10)
Hazardous Smelting
Primary
Secondary
Primary + Secondary

*Source: SMM*

# Refined Copper Supply Forecast

## China Refined Copper Supply, 2010-2035

*Unit: kilo tons*



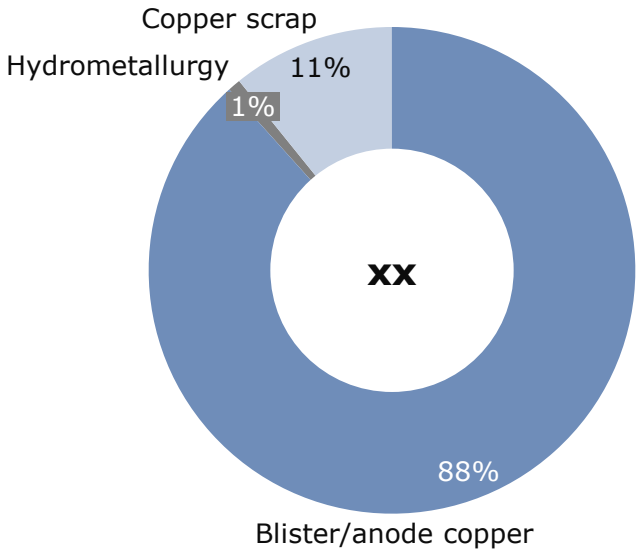

| CAGR | Refined Copper | Import Ingot |
|---|---|---|
| 2010-2015 | 9.1% | 4.7% |
| 2016-2022 | 4.8% | 0.2% |
| 2023E-2035E | xx | xx |

*Source: SMM*

# Blister/Anode Copper Demand Forecast

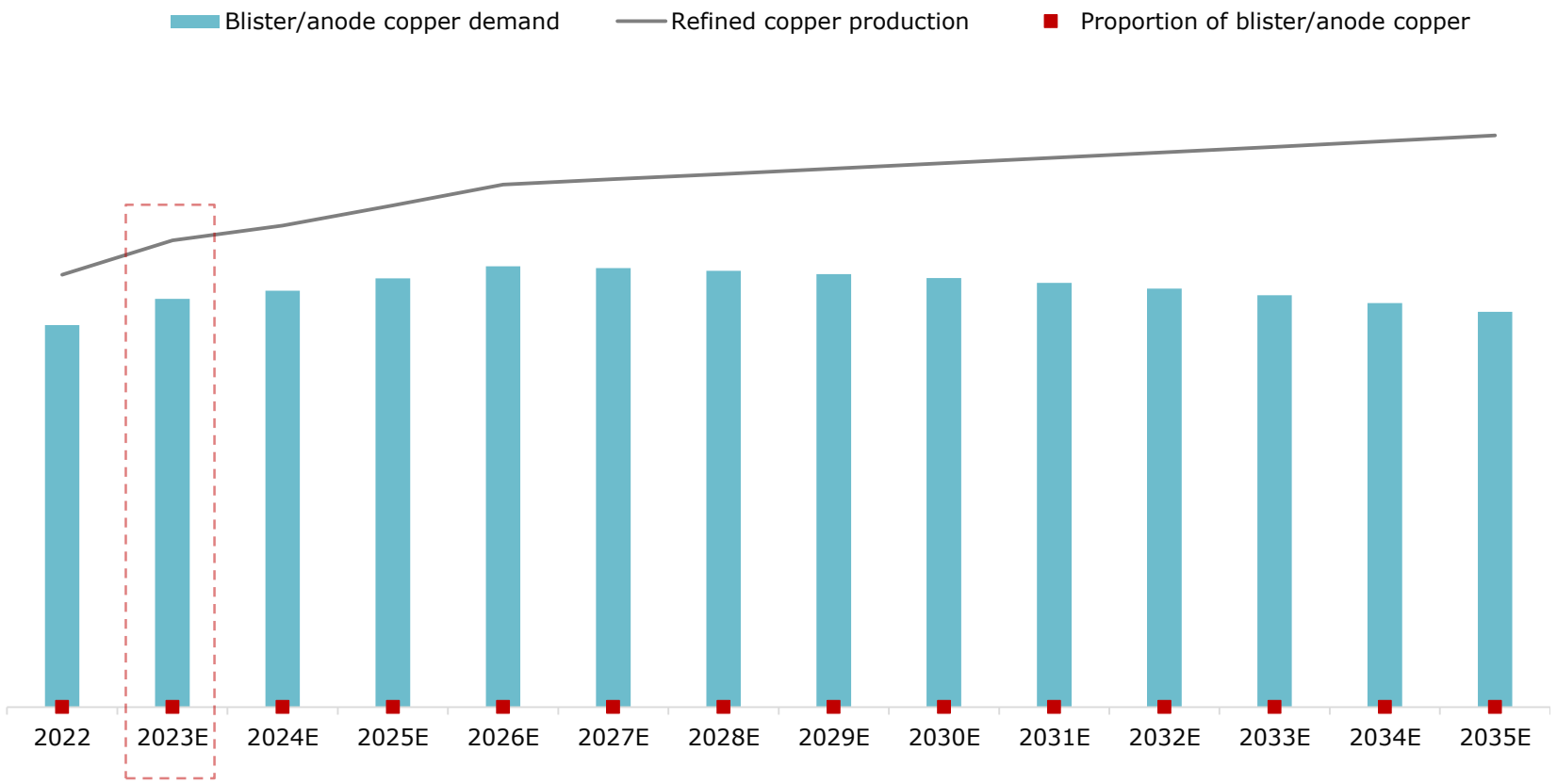
## Refined Copper Feedstock Demand by Type, 2022

*Unit: kilo tons*



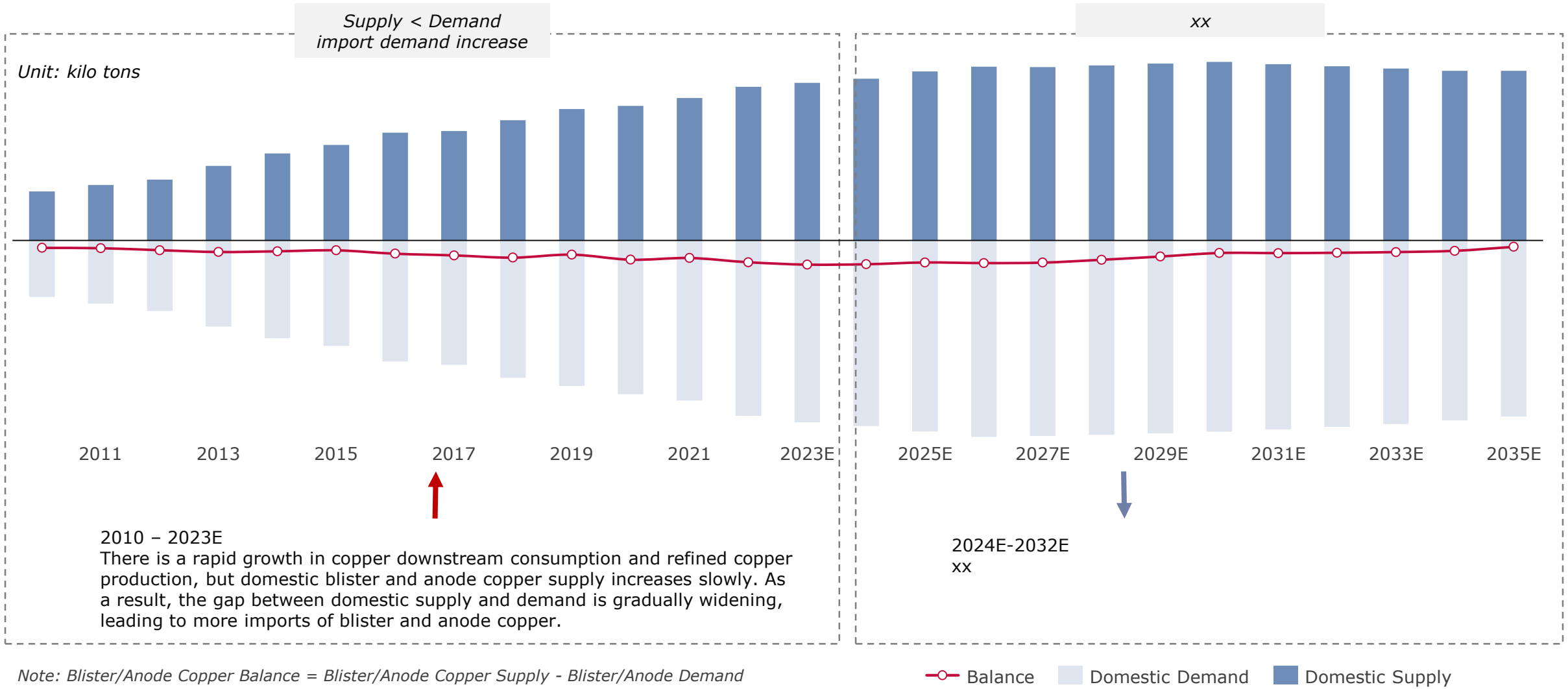

## Blister/Anode Copper Forecast, 2022-2035E

*Unit: kilo tons*




*Source: SMM*

# Domestic Blister/Anode Copper Balance (2010-2035E)




*Note: Blister/Anode Copper Balance = Blister/Anode Copper Supply - Blister/Anode Demand*

*Source: SMM*

# Pricing Method of TC / RC

## ➢ TC / RC Pricing Method

Copper Concentrate Price(MMT) = LME Copper Price -TC - RC

Copper Concentrate Physical Price = Copper Concentrate Price(MMT) *Grade * Recovery

***Note:***

- TC (Treatment charge) refers to the smelting cost of processing copper concentrate into blister copper, the unit is USD / ton.
- RC (Refining charge) refers to the processing of blister copper into refined copper smelting costs, in cents / lb.
- Both parties may choose to use the monthly average of LME daily settlement price or a target LME daily settlement price as basic reference price.
- The recovery rate deducts natural losses in copper smelting. It is generally 96.5% in the contract .
- TC is divided into long single TC and spot TC. Long list TC is divided into large list signed once a year and small list signed once a quarter.
- CSPT Group: 10 major domestic smelters, including Jiang Copper, Tongling Copper, Jinchuan Copper and Yunnan Copper, form a negotiating group on copper raw materials. Every year, CSPT team meets with overseas mines to negotiate a benchmark TC as a reference for TC price in the market.

*Source: SMM*

# Pricing Method of Price Coefficient

## ➢ Method of Price Coefficient

Copper Concentrate Physical Price = SHFE Copper Price * Grade * Price Coefficient

***Note:***

- The price coefficient takes into account the factors of processing fee and recovery rate, and is agreed by both sides of the market.
- The pricing coefficients in the southern market often refer to the prices of three large-scale smelters, Jiang Copper, Tongling Copper and Yunnan Copper. In the northern market, the pricing coefficients often refer to the smelters of Zhongtiaoshan, Baiyin and Jinchuan.
- Buyer shall have the option to either average price or a target price as SHFE copper price.
- The TC / RC and Price coefficient are closely related to the market supply and demand of copper concentrate.
- The method of TC / RC is generally used in the term-contract of imported copper concentrate. The method of “price coefficient” is usual in the domestic copper concentrate transactions.

*Source: SMM*

# Valuation Method of Copper Concentrate

| Payable metal | Grade | Recovery |
|---|---|---|
| Cu | 17-30% | 96.50% |
| | 30-40% | 96.60% |
| | 40-50% | 96.70% |
| | >50% | 96.80% |
| Au | 0-1g | no charge |
| | 1-3g | 90-91% |
| | 3-5g | 92%-93% |
| | 5-8g | 93%-94% |
| | 8-10g | 94% |
| | 10-13g | 95% |
| | 13-15g | 95.50% |
| | 15-20g | 96-96.5% |
| Ag | 0-30g | no charge |
| | >30g | 90% |

**Copper:**
Pay for xx% of the final copper content, subject to a minimum deduction of 1 (one) unit, at the official LME Copper Grade A Cash Settlement Quotation, as published in the Metal Bulletin and averaged over the Quotation Period.

**Gold:**
Buyer shall pay for a portion of the full gold content by taking reference of London AM/PM quotation , published in the Metal Bulletin and averaged over the Quotation period in accordance with the following recovery scale:
If the gold content is below 1 (one) gram per dry metric ton, no payment shall be made.
If the gold content is equal to or above 1 (one) gram per dry metric ton and below 3 (three) grams per dry metric ton, pay for 90% (ninety percent) of the full gold content of the Material.
If the gold content is equal to or above 3 (three) grams per dry metric ton and below 5 (five) grams per dry metric ton, pay for 92% (ninety-two percent) of the full gold content of the Material.
If the gold content is equal to or above 5 (five) grams per dry metric ton, pay for 93% (ninety-three percent) of the full gold content of the Material.

**Silver:**
Buyer shall pay for a portion of total silver content, at the official LBMA spot quotation for silver published in the Metal Bulletin and averaged over the Quotation Period in accordance with the following recovery scale:
If the silver content less than 30 (thirty) grams per dry metric ton of Material, then no payment shall be made.
If the silver content is equal to or above 30 (thirty) grams per dry metric ton, pay 90% (ninety percent) of the full content of the Material.

*Source: SMM*

# An Example of TC/RC Valuation Method

| | Grade of Cu | Content of Au | Content of Ag | Content of As | LME copper price | LBMA gold price | LBMA silver price | Tc of Cu | RC of Cu | RC of Au | RC of Ag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | 24.6% | 2 | 35 | 0.3 | 7488.52 | 1250 | 25 | 75 | 7.5(165.35) | 4.5 | 0.4 |
| **Unit** | % | g/t | g/t | % | USD/ ton | USD/oz | USD/oz | USD/ ton | Cents / lb (USD/ Cu ton) | USD/oz | USD/oz |

Suppose a smelter bought a batch of 24.6% grade copper concentrate from Canada on August 1, 2017, with a gold content of 2g / t, a silver content of 35g / t and arsenic content of 0.3%, LME copper settlement of 7488.52 USD/ ton, LBMA gold settlement price of 1250 USD / oz, silver settlement price of 25 USD / oz, the batch of copper concentrate copper TC is 75 USD/ ton, gold and silver RC is 4 .5 USD / oz and 0.4 USD / oz.

**Cu**

- Copper smelting costs = 1 ÷ XX% ÷ XX% × XX = XX USD /Cu ton
- copper refining costs = XX × XX ÷ XX = XX USD /Cu ton
- total costs = XX + XX = XX USD /Cu ton
- Copper concentrate of Cu price = XX-XX = XX USD/ Cu ton
- Copper concentrate of Cu physical price = XXXX × XX% × XX% = XX USD/ ton

**Ag**

- Ag refining costs=XX USD/oz
- Copper concentrate of Ag price=XX-XX=XX USD/oz
- Copper concentrate of Ag physical price=XX/XX*XX*XX%=XX USD/ ton

**Au**

- Au refining costs= XX USD/oz
- Copper concentrate of Au price= XX-XX= XX USD/oz
- Copper concentrate of Au physical price=XX/XX*XX*XX%=XX USD/ ton

**Cu+Au+Ag**

- Copper concentrate of Cu , Au and Ag physical price=XX+XX+XX= XX USD/ ton
- After deducting arsenic=XX-XX=XX USD/ ton

*Source: SMM*