# Capital Markets Day

**November 2008**

# Copper smelter revenue stream

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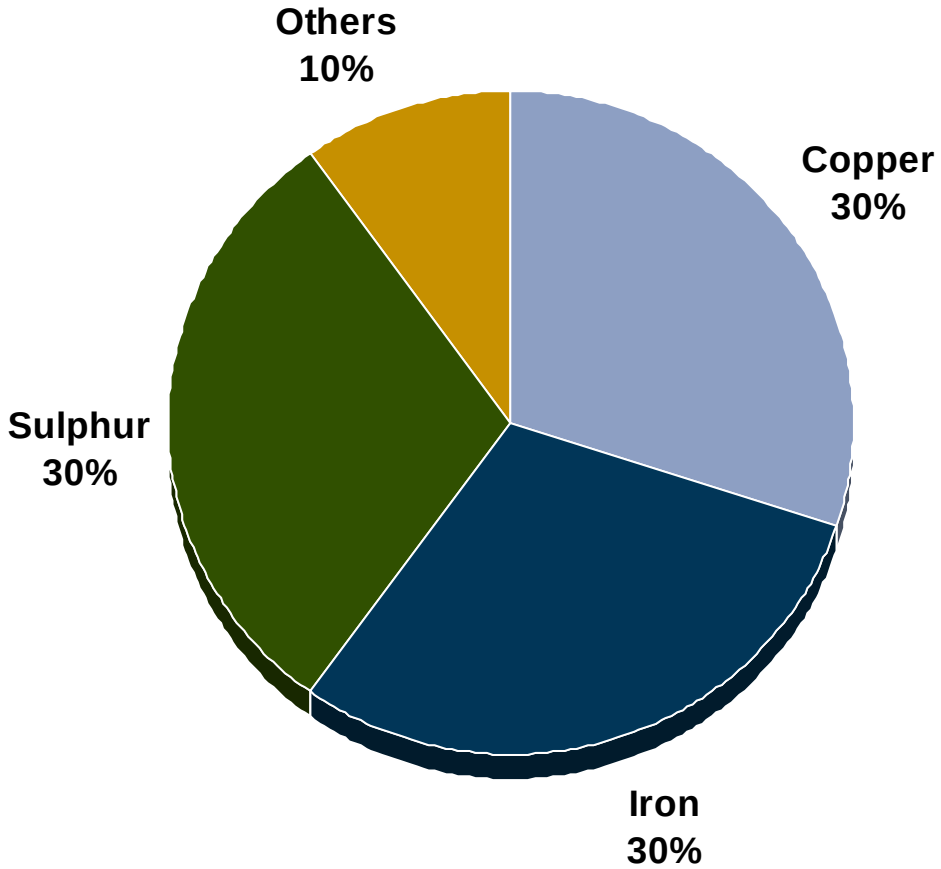
# Table of content

# 1. Important information

This presentation contains examples of common calculations that can be used to model the businesses in which Boliden operates.

All concentrate specification and contract terms presented here are hypothetical and are used to illustrate the relevant calculations.

# 2. Copper concentrate – examples of content




- Others include for example gold 2-40 g/DMT and silver 30-200 g/DMT

# 3. Pricing of copper concentrates

The price of the raw materials shall be **the sum of the values of the payable metals** less the sum of the deductions.

In general smelting business consists of the following gross profit elements:

- Treatment Charge and Refining Charge for copper
- Refining Charges for other metals
- Free metals
- By product credits
- Metal premiums

# 3.1 Typical pricing clause – Copper

The price of the raw materials shall be **the sum of the values of the payable metals** less the sum of the deductions.

Buyer shall pay for 96.65% of the final copper content, subject to a minimum deduction of 1.0 unit at the official LME Grade A Settlement Copper Quotation averaged over the quotational period.

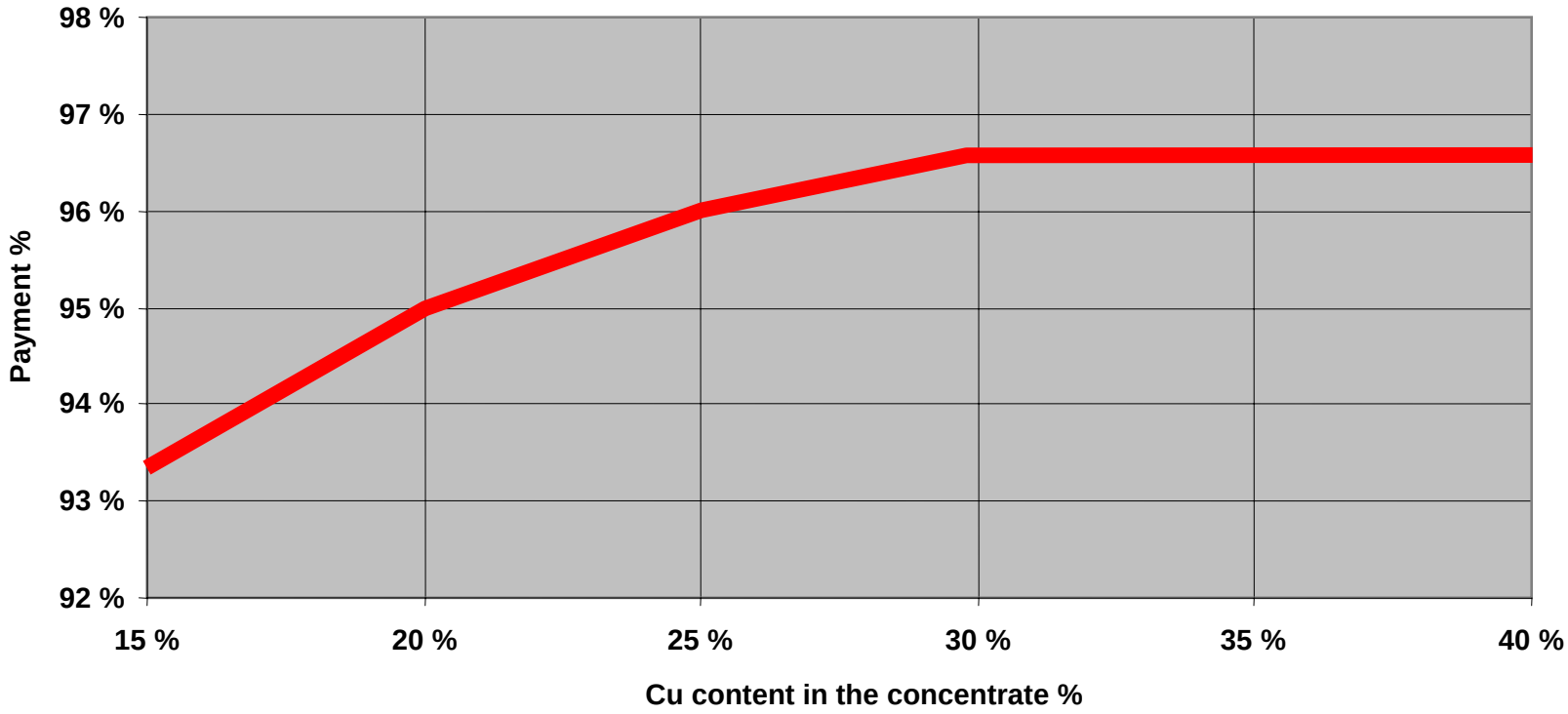
Example) For a concentrate with a copper content of 30 % the payable copper value is:

**30% x 96.65% x 7,000 USD/t-Cu = 2,030 USD/DMT**

Example) For a concentrate with a copper content of 24% the payable copper value is 24% – 1%-unit = 23% i.e. 23/24 x 100 = 95.83% payment:

**(24%-1%) x 7,000 USD/t-Cu = 1,610 USD/DMT**

# 3.1 Typical pricing clause – Copper




- Minimum deduction mechanism compensates smelters for processing low grade concentrates.

# 3.1 Typical pricing clause – Gold

The price of the raw materials shall be **the sum of the values of the payable metals** less the sum of the deductions.

Buyer shall pay for 97.50% of the final gold content, subject to a minimum deduction of 1.0 g per DMT, at the London Morning Quotation averaged over the quotational period.

Example) For a concentrate with a gold content of 40 g/DMT the payable gold value is:

**40 g/DMT x 0.0321 x 97.50% x 800 USD/troz = 1,002 USD/DMT**

Example) For a concentrate with a gold content of 2.0 g/DMT the payable gold value is 2 g/DMT – 1 g/DMT = 1 g/DMT i.e. 1.0/2.0 x100 = 50.0% payment:

**(2.0 g/DMT – 1.0 g/DMT) x 0.0321 x 800 USD/troz = 25.7 USD/DMT**

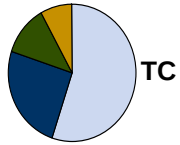
# 3.1 Typical pricing clause – Silver

The price of the raw materials shall be **the sum of the values of the payable metals** less the sum of the deductions.

Buyer shall pay for 90.0% of the final silver content, subject to a minimum deduction of 30.0 g per DMT, at the London Silver Spot/US Cents Quotation averaged over the quotational period.

Example) For a concentrate with a silver content of 200 g/DMT the payable silver value is 200 g/DMT – 30 g/DMT = 170 g/DMT i.e. 170/200 x 100 = 85.0% payment:

**(200 g/DMT – 30 g/DMT) x 0.0321 x 12 USD/troz = 65.5 USD/DMT**



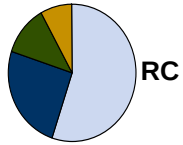

# 3.2 Deductions – Treatment Charge (TC)

The price of the raw materials shall be the sum of the values of the payable metals less **the sum of the deductions**.

Treatment Charge shall be 45 USD per DMT of concentrate.

Example) **1 DMT Cu concentrate x 45 USD= 45 USD/DMT**

TC,RC and Price Participation are negotiated annually between miners and smelters. Typically negotiations start in October and normally finished by year-end. Benchmark terms are normally established when the major mines and smelters have agreed the annual terms.



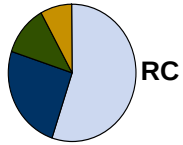

# 3.2 Deductions – Refining Charge (RC)

The price of the raw materials shall be the sum of the values of the payable metals less **the sum of the deductions**.

The refining charge for payable copper shall be 4.5 USc per pound of payable copper.

Example) For a concentrate with a copper content of 24% the payable copper value is 24% – 1 %-unit = 23%.

**23% x 22.046 x 4.5 USc/lb = 22.8 USD/DMT**




# 3.3 Deductions – Price Participation (PP)

The price of the raw materials shall be the sum of the values of the payable metals less **the sum of the deductions**.

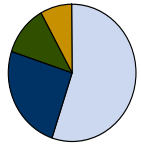
On long-term contracts there has been a Price Participation clause in the past. i.e. the copper RC shall be increased by 0.10 USc per payable pound of copper for each 1.00 USc per pound which the average LME settlement price for Grade A copper during quotational period exceeds 90 USc per pound payable copper.

Example) An average LME settlement price at 140 USc/lb.

**Copper PP: (140 USc/lb – 90 USc/lb) x 10% = 5.0 USc/lbs**

**Copper RC incl. PP: 4.5 USc/lb + 5.0 USc/lb = 9.5 USc/lb**

In recent years the miners have not accepted shown structure for PP in the annual negotiations.



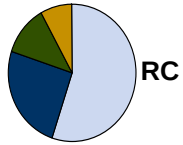

# 3.4 Deductions – Refining Charge for gold

The price of the raw materials shall be the sum of the values of the payable metals less **the sum of the deductions**.

The Refining Charge for payable gold shall be 6.0 USD per ounce of payable gold.

Example) For a concentrate with a gold content of 40 g/DMT the Refining Charge for gold is:

**40 g/DMT x 97.50% x 0.0321 x 6.0 USD/troz = 7.5 USD/DMT**



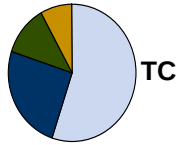

# 3.4 Deductions – Refining Charge for silver

The price of the raw materials shall be the sum of the values of the payable metals less **the sum of the deductions**.

The Refining Charge for payable silver shall be 35.0 USc per ounce of payable silver.

Example) For a concentrate with a silver content of 200 g/DMT the payable silver value is 200 g/DMT – 30 g/DMT = 170 g/DMT:

**170 g/DMT x 0.0321 x 0.35 USD/troz = 1.9 USD/DMT**




# 3.5 Deductions – Penalties

The price of the raw materials shall be the sum of the values of the payable metals less **the sum of the deductions**.

For instance, a zinc penalty means that for each 1.0 units by which the final zinc assay exceeds 3.00%, the seller shall pay a penalty charge of 3.00 USD per DMT of concentrates, fractions pro rata.

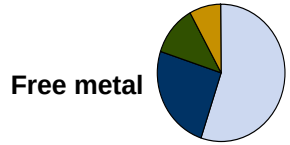
Example) A final zinc assay of 5.00%, i.e. 2%-units over 3.00%:

**2 x 3.0 USD/DMT = 6.0 USD/DMT**

Penalty clauses are typically applied for the impurities harmful to copper smelting and refining processes.

# 4. Pricing of secondary raw materials

- In addition to copper concentrate, secondary raw materials can be used as raw material.
- Secondary raw materials include (among other things):
  - Copper scrap
  - Electronic scrap (containing copper, gold, silver and lead)
  - Copper/zinc residues
- Commercial terms for these materials are constructed and calculated in the same way as copper concentrate but levels of Payment %, TC and RC are not necessary following the copper concentrate terms.
- Legislations and “green image” are strong drivers to recycle material suitable for a copper smelter.



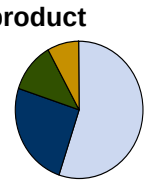

# 5. Free metal

The value of the free copper, gold and silver in a copper concentrates for a copper smelter is **depending on the recovery rate, LME copper price and LMBA gold and silver price**.

In this example the recovery rate for a copper smelter is 98.0%. The value of free gold and silver is normally greater than the value of the free metal for copper.

Example) Value of Free Cu = Cu content x (Recovery% - Payable Cu %) x LME Cu price:

**30% x (98.0% - 96.65%) x 7,000 USD/t-Cu = 28.4 USD/DMT**



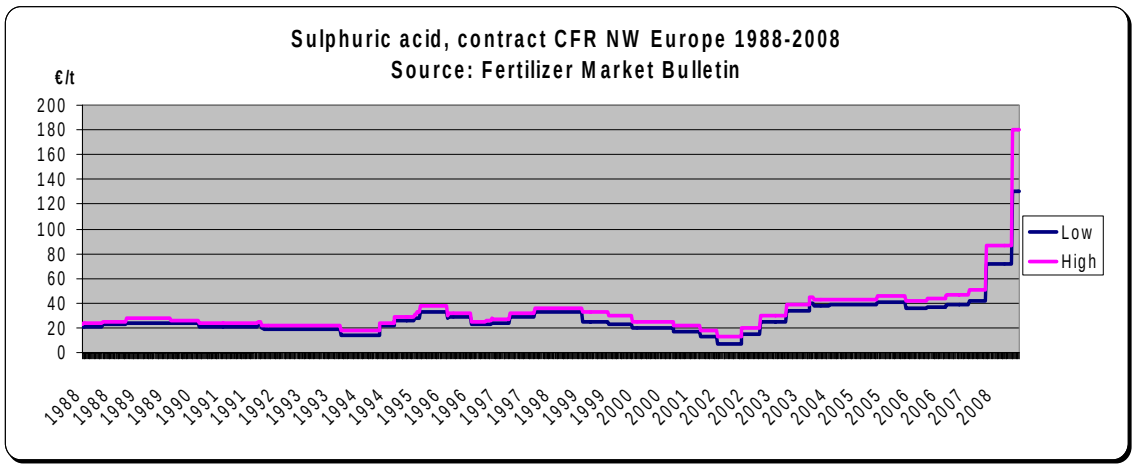

# 6. By-product credits

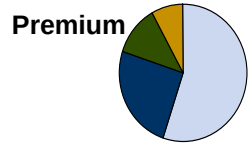
- Main by-product for a copper smelter is sulphuric acid (H2SO4)

Example) Value of Sulphur (rule of thumb)= 1 DMT of Cu concentrate with 30% of sulphur gives approximately 1 ton of sulphuric acid (H2SO4) depending on recovery rate. Typical recovery rate is 95% in a Cu smelter.

**1 DMT Cu concentrate (30%S) x (98/32) x 95% ➡ 0.873 ton H2SO4**

**x 75 USD/t = 65.5 USD/DMT**





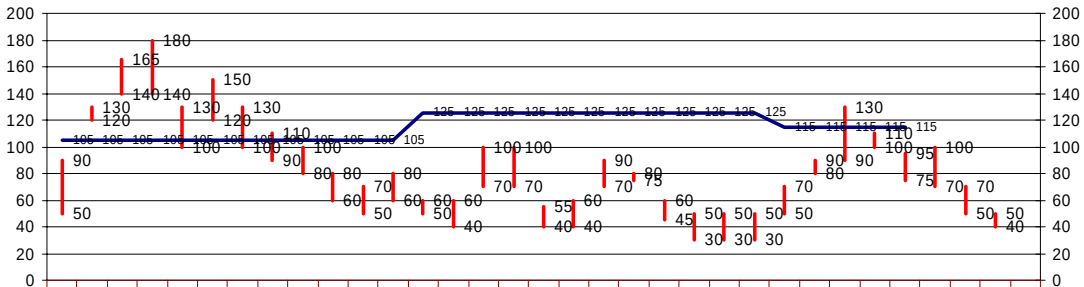

# 7. Metal premiums

- The value of metal premium depends on:
  - Demand/supply situation
  - The product (preferred quality)
  - The amount of value added in customer service functions

Example) Value of metal premium = Metal ton x Cu content x recovery rate x premium/USD

**1 MT Cu metal x 30% x 98.0% x 115 USD/t = 33.8 USD/DMT**

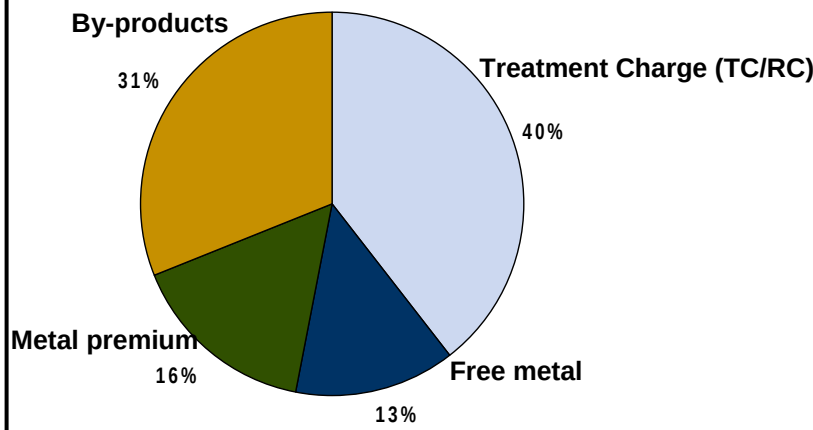
**CIF NW Europe port US$/ton + Coldeco Premia**



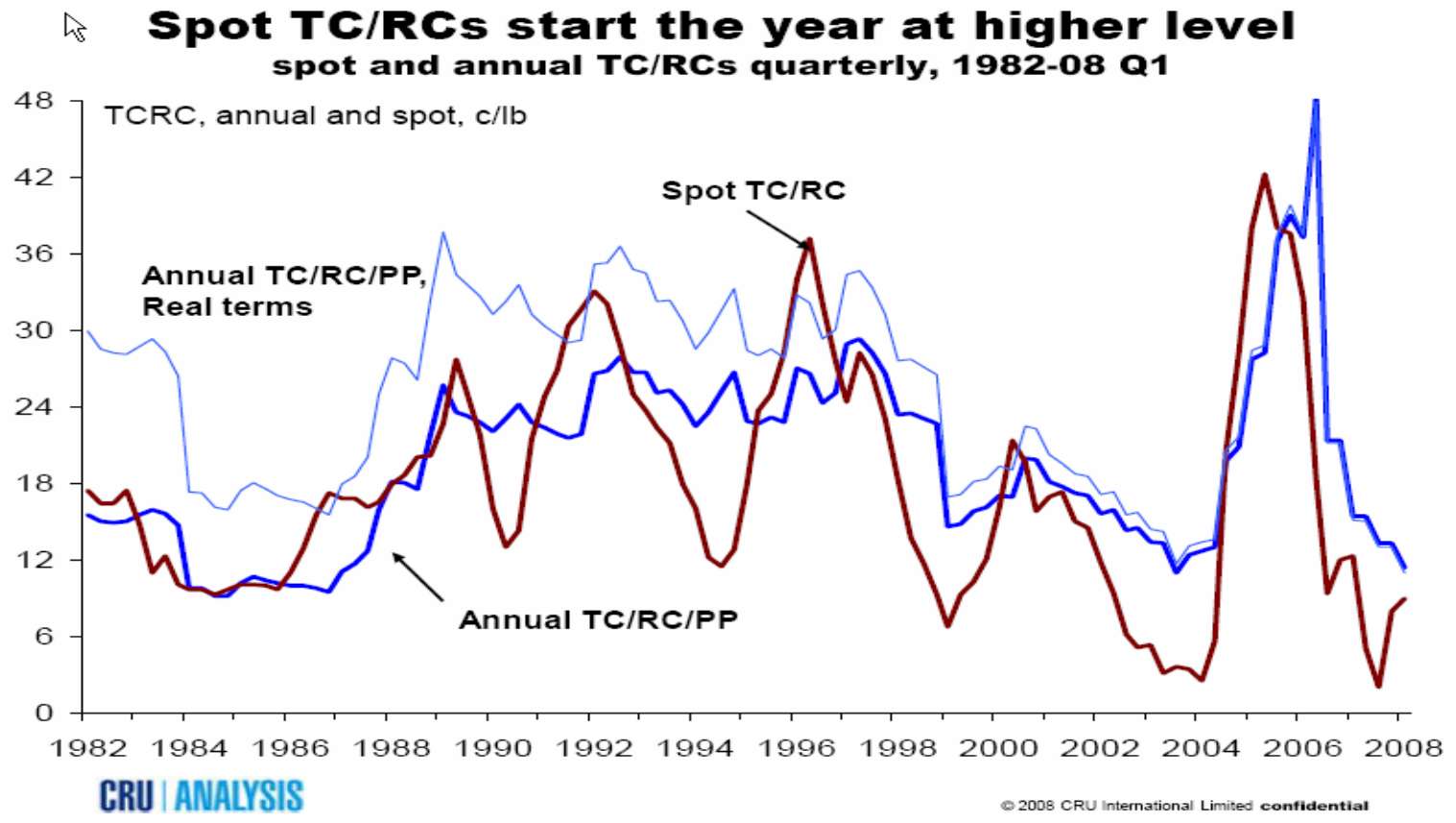
| | Jan 06 | Feb 06 | Mar 06 | April 06 | May 06 | June 06 | July 06 | Aug 06 | Sep 06 | Oct 06 | Nov 06 | Dec 06 | Jan 07 | Feb 07 | Mar 07 | April 07 | May 07 | June 07 | July 07 | Aug 07 | Sep 07 | Oct 07 | Nov 07 | Dec 07 | Jan 08 | Feb 08 | Mar 08 | April 08 | May 08 | June 08 | July 08 | Aug 08 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Low | 50 | 120 | 140 | 140 | 100 | 120 | 100 | 90 | 80 | 60 | 50 | 60 | 50 | 40 | 70 | 70 | 40 | 40 | 70 | 75 | 45 | 30 | 30 | 30 | 50 | 80 | 90 | 100 | 75 | 70 | 50 | 40 |
| High | 90 | 130 | 165 | 180 | 130 | 150 | 130 | 110 | 100 | 80 | 70 | 80 | 60 | 60 | 100 | 100 | 55 | 60 | 90 | 80 | 60 | 50 | 50 | 50 | 70 | 90 | 130 | 110 | 95 | 100 | 70 | 50 |
| Premia Codelco | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 115 | 115 | 115 | 115 | 115 | | | |

# 8. Putting copper smelters' revenues together

| Treatment Charge (TC/RC) | USD/DMT | Share |
|---|---|---|
| TC:1 DMT Cu concentrate x 45 USD= | 45 | |
| RC: 23% x 22.046 x 4.5 USc/lb = | 22.8 | |
| PP: No PP | 0 | |
| Au: 40 g/DMT x 97.5% x 0.0321 x 6.0 USD/troz = | 7.5 | |
| Ag:170 g/DMT x 0.0321 x 0.35 USD/troz = | 1.9 | |
| Zn penalty: 2 x 3.0 USD/DMT = | 6.0 | |
| **Sum TC/RC** | **83.2** | **40%** |
| **Free metal** | | |
| Cu: 30% x (98.0% - 96.65%) x 7,000 USD/t-Cu = | 28.4 | |
| **Sum Free metal** | **28.4** | **13%** |
| **By-products** | | |
| 1 DMT Cu concentrate (30%S) x (98/32) x 95% = 0.882 ton H2SO4 x 75 USD/t | 65.5 | |
| **Sum By-product** | **65.5** | **31%** |
| **Metal premium** | | |
| Cu Premium: 1 MT Cu metal x 30% x 98.0% x 115 USD/t | 33.8 | |
| **Sum Metal premium** | **33.8** | **16%** |
| **Sum Raw Material revenue** | **210.9** | **100%** |

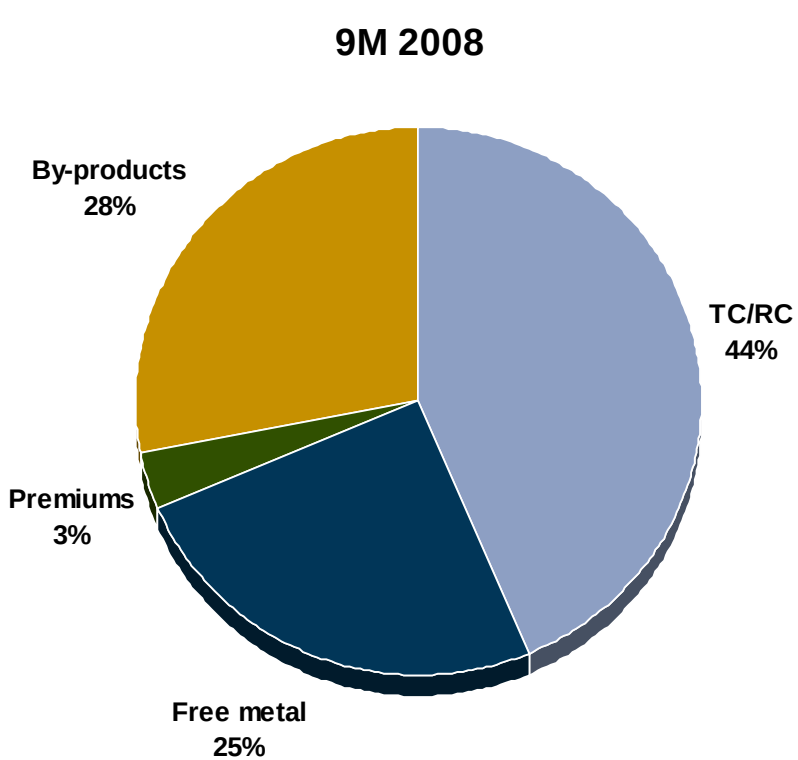


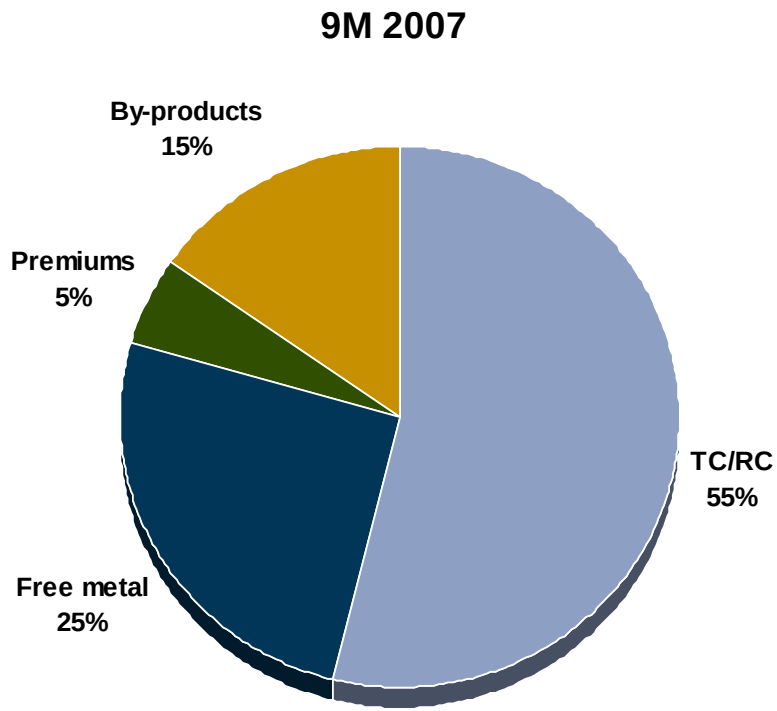
# 8.1 Putting copper smelters' revenues together



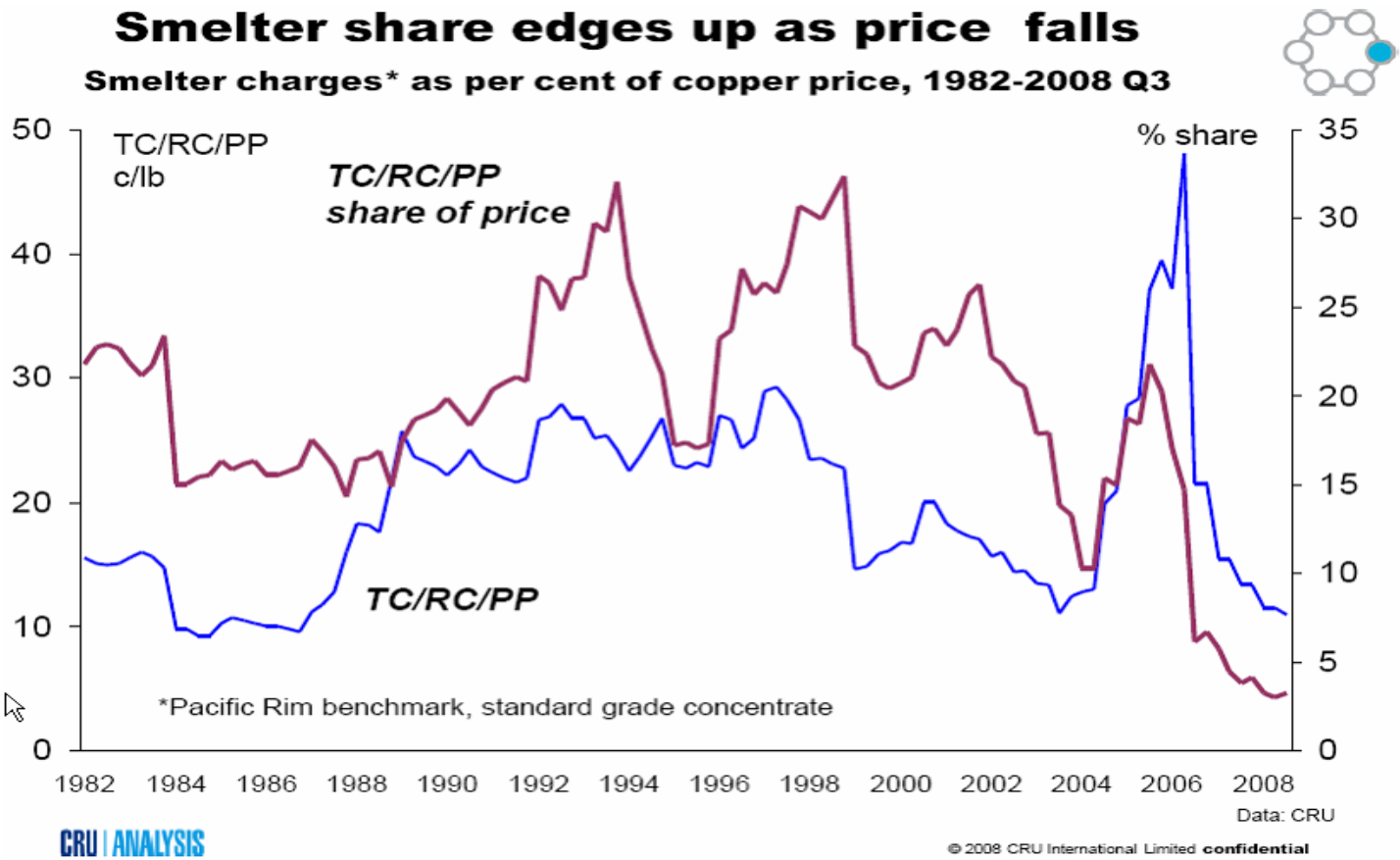
# 8.2 Putting copper smelters' revenues together

Boliden's copper smelters' approximate year-to-date revenue distribution

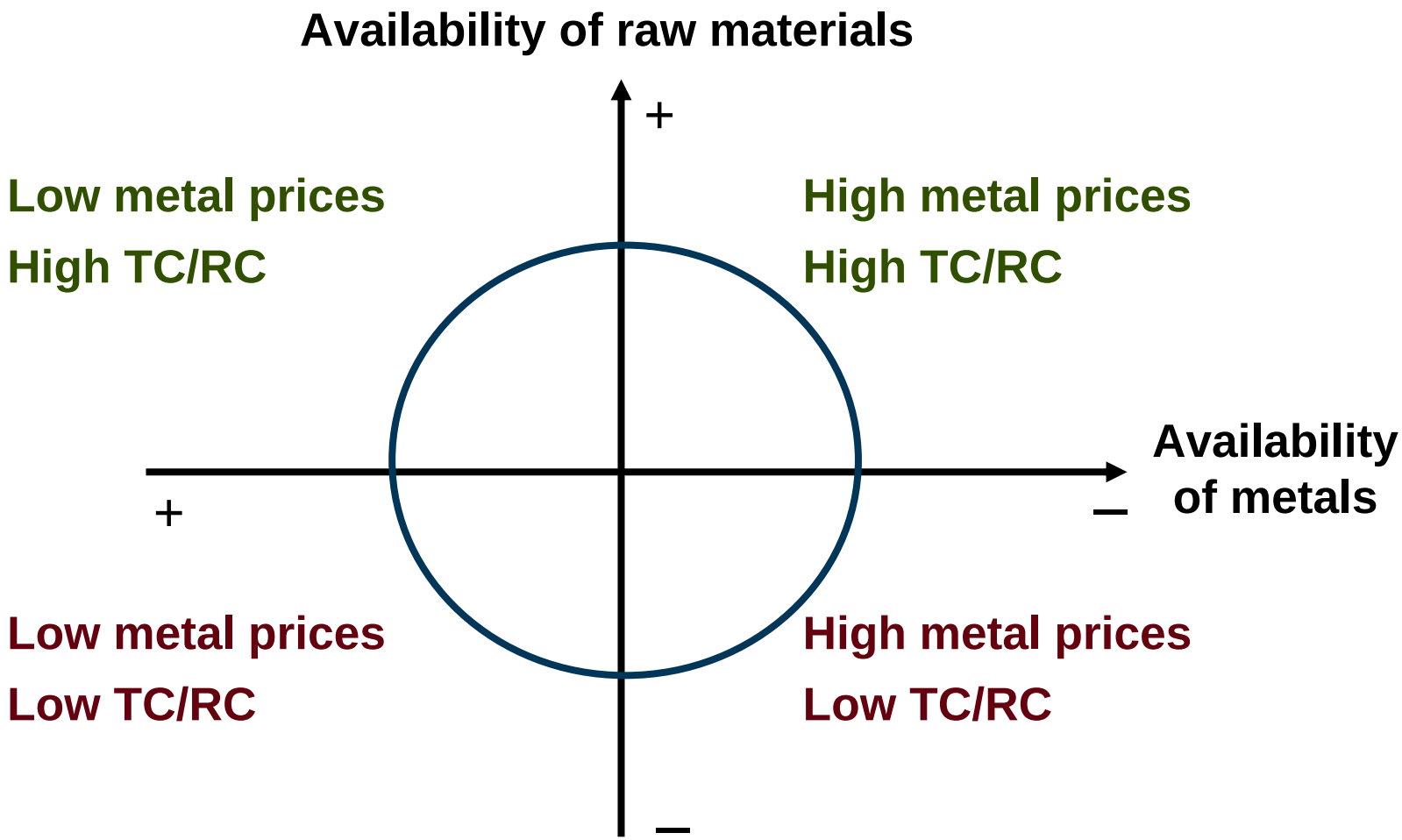


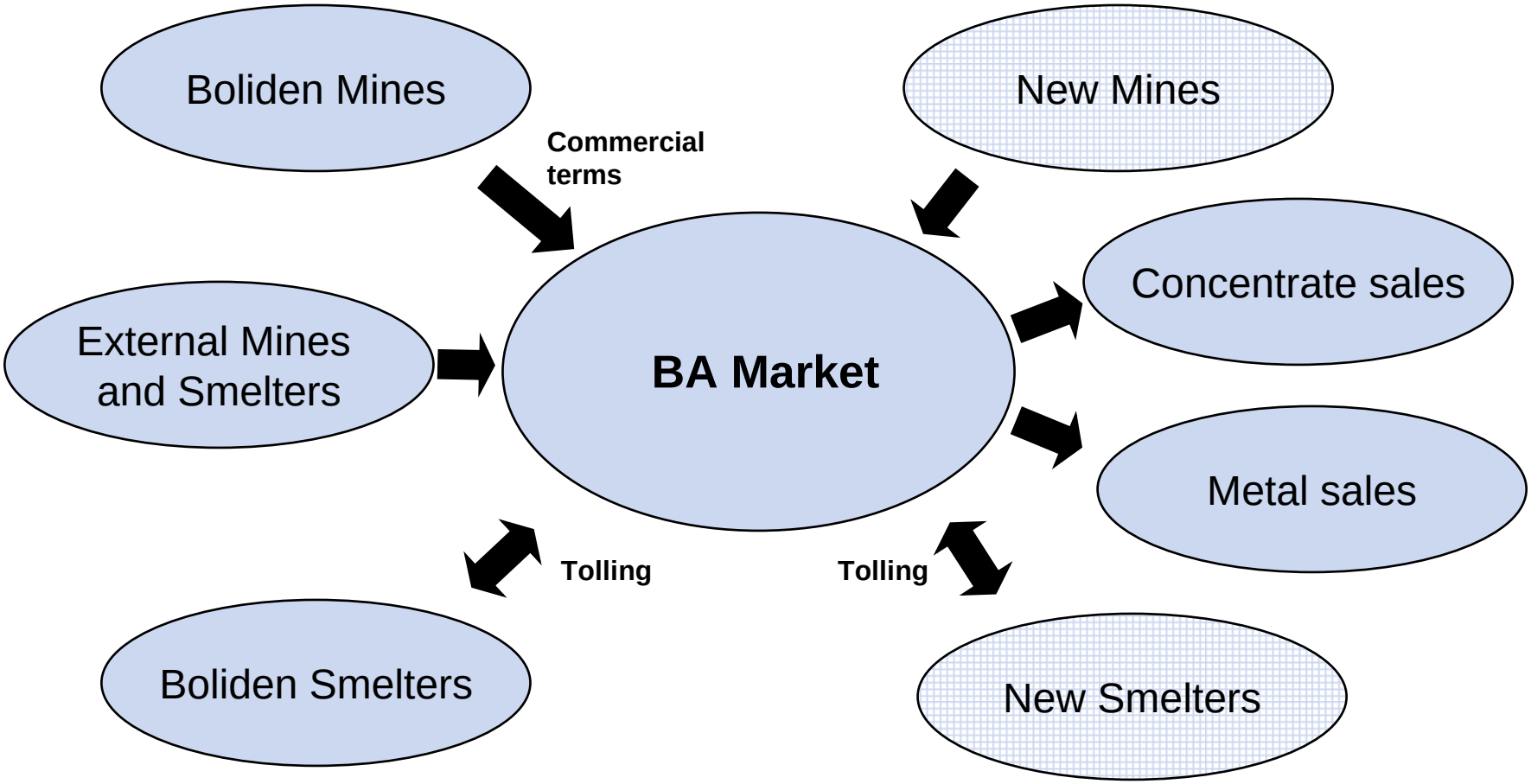
# 9. Smelters' share of raw material value



# 10. Business cycle of metals



# 11. How to increase smelters' profit?




Tolling concept (optimisation and rules for settlement/compensation) is the cornerstone in BA Market Business model