The Zinc Market Outlook

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What is the zinc price for next year??
This is Boliden

Exploration  
Mines  
Smelters  
Recycling

Main metals: zinc and copper, lead, gold and silver
Boliden is based in Northern Europe

Listed on the Stockholm Stock exchange in Sweden and Toronto Stock Exchange in Canada
Boliden’s Operations

- **Aitik (Sweden)**: Copper mine
- **Garpenberg (Sweden)**: Zinc mine
- **Tara (Ireland)**: Zinc mine
- **Boliden Area (Sweden)**: Zinc mines
- **Rönnskär (Sweden)**: Copper smelter
- **Harjavalta/Pori (Finland)**: Copper smelter
- **Kokkola (Finland)**: Zinc smelter
- **Odda (Norway)**: Zinc smelter
- **Bergsöe (Sweden)**: Lead smelter

Mines, Smelters, Sales offices

[Map showing Boliden’s operations in Europe]
## Metal Production 2010

<table>
<thead>
<tr>
<th>Metal</th>
<th>Production, tonnes</th>
<th>Mines</th>
<th>Smelters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>76,000</td>
<td>303,200</td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>293,800</td>
<td>456,000</td>
<td></td>
</tr>
<tr>
<td>Gold</td>
<td>3,700</td>
<td>14,220</td>
<td></td>
</tr>
<tr>
<td>Silver</td>
<td>230,600</td>
<td>450,300</td>
<td></td>
</tr>
</tbody>
</table>
I know what the zinc price is for next year!
The "current" LME Zinc price for future delivery

Source: www.basemetal.com
Summary Zinc Market Outlook

✓ Global zinc market in oversupply until 2013

✓ (Volatile) Zinc prices driven by future expectations
  ✓ Consumption growth in developing countries
  ✓ Shortage of mining capacity

✓ Cost increase smelting and mining
The Zinc Price
NO, the LME is a futures market.
 Zinc price is based on future supply and demand expectations
SO WHAT IS DRIVING THE ZINC PRICE THEN?

LME Zn Price

Short term drivers
Long term drivers
Chinese fiscal tightening worries
MENA unrest intensifies; Brent crude spikes to 120 USD/bbl
Disaster in Japan
S&P revise US outlook for negative
Unrest in Tunisia and Egypt
Copper hits 10,000 USD/t but finds no buyers
Goldman Sachs advises investors to go underweight commodities for next 3-6 mnts
Chinese rate hike
Japanese smelters are reported to having buy zinc in order to meet customer orders
Good US Employment figures
Home builder sentiment stagnates in the US
Islandic volcano ash cloud
Short term drivers stagnate in the US
Goldman Sachs advises investors to go underweight commodities for next 3-6 mnts
Short term drivers create volatility
Source: Thomson Reuters Datastream, Reuters, Esmerk
Short term drivers create volatility

Source: Thomson Reuters Datastream
Long term drivers

- Strong future demand
- Shortage mining capacity

...... resulting in shortage of zinc
Developing countries drive zinc demand

2010 Zinc consumption vs GDP per capita 2010 estimates

Source: CIA World Factbook, IMF, Brook Hunt - A Wood McKenzie Company, calculations by Boliden
China will drive the demand growth

Source: Brook Hunt - A Wood McKenzie Company

Growth 2010-2015
- Africa: 22%
- Oceania: 21%
- Japan: 12%
- Latin America: 24%
- North America: 15%
- Asia (excl Japan & China): 32%
- Europe: 10%
- China: 47%

Actual/Forecast Smelter Production
Strong long-term outlook for zinc demand – China’s vehicle ownership today below USA in 1918

Levels of motor vehicle ownership relative to population

US motor vehicle ownership increased almost fourfold in only ten years from 1918-1928
If China’s motor vehicle ownership followed the same road it would add ~180m units to the country’s vehicle fleet by 2020
This equivalent to about 70% of the entire vehicle fleet in the USA today
In 2010, China’s motor vehicle output was over 18m units, putting it on track for this expansion even if output flat-linest from here

USA: 802 vehicles / 1000 population
China: 56 vehicles / 1000 population

China: 250 vehicles / 1000 population

200 cars / 1000 pop. = 260 mln cars

5.2 mln tonnes Copper
2.6 mln tonnes Zinc
2.6 mln tonnes Lead
520 tonnes Gold
260 tonnes Silver
Fund Investments Zinc

Source: CRU (www.crugroup.com)
Mines & Smelters

How are the revenues shared?
Fundamentals: Mines and smelters share the cake
Mines and smelters share the cake

Smelter share

- By products
- Metal premium
- Treatment and Refining charge
- Free metal main and by-metal
- Payable by-metals

Mine share

- Payable main metal
- Metal value LME
When the LME price increases, the cake grows
Concentrate market decides how to share revenues between mines and smelters!
Development mines and smelter share

Source: CRU (www.crugroup.com)
Development mines and smelter share

Source: CRU (www.crugroup.com)
The **Cash Operating Cost** is, in effect, the cost of producing zinc FOB at the smelter exit gate.

**Zinc Smelter Cost curve is “flat”**

Source: Brook Hunt – A Wood Mackenzie Company

The Cash Operating Cost is, in effect, the cost of producing zinc FOB at the smelter exit gate.
"Sufficient" Zinc Smelter Projects

SOURCES OF FUTURE SMELTER PRODUCTION

Source: Brook Hunt - A Wood Macquenzie Company
Large capacity increase in China

Smelter capacity increases 2010-2017 Total: 4 570 Kt

Source: Brook Hunt - A Wood Mackenzie Company
Zinc Mine Cost curve is steep – Last tons “expensive”

Last 10%: Operating Costs increase 650 USD/MT

Source: Brook Hunt – A Wood Mackenzie Company

2 247 USD/t

1 300 USD/t

Last 10%
Few Mine Projects: bottleneck

SOURCES OF FUTURE MINE PRODUCTION

Source: Brook Hunt - A Wood Macquenpie Company
Cost smelters will probably increase further due to increases in energy, labour and raw material cost.

New mine projects are at the higher end of the cost curve.
Global concentrate market is in balance

Source: CRU (www.crogroup.com) Q1 2011
Global Zinc Market – Oversupply -> Shortage

World Zinc Metal Balance

Source: CRU (www.crugroup.com) Q1 2011
Global Industrial Production Growth

- Continued robust global growth
- China, continued high growth
- Strong development in mature regions

Source: Reuters Datastream, IMF, Boliden calculation of world IP
Construction Market = 50% of Zinc Demand

- No sign of slowdown in China
- USA still weak
- Europe:
  - North: Recovering
  - South & UK /Ireland: Weak

Source: Reuters Datastream
Automotive Market

- Europe and North America
  - High growth in USA
  - Germany somewhat slower
  - Export lead production in Europe
  - Production level still well below last peak in mature economies

Source: CRU (www.crumonitor.com), JD Powers
Summary Zinc Market Outlook

- Global zinc market in oversupply until 2013
- (Volatile) Zinc prices driven by future expectations
  - Consumption growth in developing countries
  - Shortage of mining capacity
- Cost increase smelting and mining
So what does this mean for metal prices?

I am a chemical engineer, not a fortune teller!
The zinc price you will pay in the future?

If you are a buyer you know exactly what you pay in the future!!
Boliden produces metals that make modern life work