The Lead & Zinc Industry in Europe and the Role of Boliden

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Boliden Smelters
Population and income distribution

Cumulative share of world GDP (PPP) %

- Income distribution 2013
- Income distribution 1995
- Line of equal distribution

Cumulative share of world population %

Source: IMF data for 183 countries ranked by GDP per capita in US$ PPP

Zinc and GDP 2013

Zn demand kg/capita

Source: Wood Mackenzie, CRU Ltd, Reuters Datastream
Zinc and GDP 2013

Zn demand kg/capita

Source: Wood Mackenzie, CRU Ltd, Reuters Datastream

European Lead & Zinc end user demand by segment

Source: Wood Mackenzie
Boliden 2014

- Nordic metals company with a focus on sustainable development
- Core competence in exploration, mining, smelting and metals recycling
- Four mining areas and five smelters
- Copper, zinc, lead, silver and gold

About Boliden:
Supplier to the European metals industry

- Own mine concentrates mostly sold to own smelters
- Customers located in northern Europe
- Zinc metal to steelworks for rust-proofing (galvanising)
- Copper metal to wire rod and copper rod manufacturers
- Lead to car battery manufacturers
- Gold and silver is sold for industrial production and as a financial asset
Boliden metals has a diversified supply base

### Lead Production 2014 (Kt)

- **Boliden Smelters**: 69
- **Boliden Mines**: 48
- **External Mines**: -
- **Urban Mines**: 45

### Zinc Production 2014 (Kt)

- **Boliden Smelters**: 455
- **Boliden Mines**: 272
- **External Mines**: 228
- **Urban Mines**: 55

Boliden Aitik mine, Gällivare, Sweden

### Boliden copper smelters

**Rönnskär, Sweden**

- Copper, secondary and lead smelter
- Flexible smelter adapted to complex raw materials
- World leader in e-material recycling
- Unique capabilities: kaldò and fuming technologies and Zn-clinker recycling
- Total feed, 852 kton

**Harjavalta, Finland**

- Copper and nickel smelter
- Flexible smelter adapted to copper and nickel concentrates
- Nickel tolling smelter
- Total feed, 748 kton

IlZSG meetings Lisbon 2014-04-02

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IlZSG meetings Lisbon 2014-04-02
Boliden secondary lead smelters

Bergsöe, Sweden
Secondary lead smelter
- Shaft furnace technology
- Only secondary lead smelter in the Nordics
- Lead batteries and other secondaries, 63 kton

Secondaries
63 kton

Boliden zinc smelters

Kokkola, Finland
Zinc smelter
- Roaster and Direct leaching technology
- Silver recovery Q3 2014
- Zinc concentrate, 602 kton

Zinc concentrate
602 kton

Odda, Norway
Zinc smelter
- Roaster and Direct leaching technology
- Aluminium fluoride production
- Zinc concentrate and zinc clinker, 263 kton

Zinc concentrate (incl. Zinc clinker)
263 kton
Boliden Challenges for the future!

European zinc smelters
Cash margin 2014
European zinc smelters
Cash conversion cost 2014

Zinc primary producers in Western Europe 1980 - 2013

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No new smelters and few new potential mines legend is on next page...
European zinc mine production declining

Source: Wood Mackenzie
Environmental legislations is good!
.....but

- In commerce, a level playing field is a concept about fairness, not that each player has an equal chance to succeed, but that they all play by the same set of rules.

Regulatory issues that can have an impact on European Metals Industry and Boliden

- Registration, Evaluation, Authorisation and Restriction of Chemical substances (REACH)
- Lead in Zinc products (alloys, concentrates, intermediates) (REACH)
- Draft Reference Document on Best Available Techniques for the Non-Ferrous Metals (NFM BREF)
- Raw Materials Initiative (RMI)
- Occupation exposure limit (inhalation)
- Environmental Footprint (PEF and OEF)
- Drinking Water Directive (DWD): implementation and revision
- Low-carbon economy roadmap to 2050
- CO2 Emissions Trading Scheme (ETS)
- Waste framework directive (WFD) - revision recycling targets – Landfill ban - Ex post checks
- IMO and bulk transport regulations (GLOBAL)
In addition to our everyday challenges...

new rules will come into effect 2015, regulating sulphur content for Marine Fuel
Consequences

- Both raw material and metal affected
- Final impact pending actual fuel price difference
- Freight cost effect estimated to about $4/ton = 20-25%

Boliden total sea freight volume of 3.500.000 ton, will be hit by negative cost effect of about 14 Million dollars!!
Boliden opportunities for the future!

Growth philosophy

- Acquisitions
- Organic growth brown/greenfield
- De-bottlenecking
- Stable production New Boliden Way
Organic growth pipeline
Capex driven

Garpenberg expansion

- An SEK 3.9 billion investment
- Increase in ore capacity from 1.4 to 2.5 million tonnes per year
- Full production by the end of 2015
- Production until 2030
- New industrial area
  - New underground facilities
  - New concentrator
  - New infrastructure
- Enhanced competitive position
- Production costs cut by approx. 25 per cent
The Reuter Wheel

Carrier metal. Bulk metal generally of lower value

Co-elements with considerable own production infrastructure. High economic value, some used in high tech applications

Co-elements with no, or limited own production infrastructure. Mostly high economic value, high-tech metals

Co-elements that end up as residues, or as emissions. Costly because of waste management or end of pipe measures


Extract more value - silver recovery at Kokkola

- Increasing silver content in Zn concentrates
- Higher silver prices
- Improved profitability and raw material efficiency
- An EUR 27 million (SEK 250 m) investment with high return
- Proven technology
- The annual volume of silver recovered is estimated at approx. 25 tonnes/year
- The investment starts in April 2012
- Production starts in Q3 2014
Recycling within Boliden

Good opportunities for Landfill at Odda

- During 26 years of operation all waste has been stored in mountain caves
- No emissions to the neighbouring area
- New mountain caves will be built during 2014
- Take care of other hazardous waste from own operation in other countries
- EU can be an opportunity
**Boliden Odda**
landfill in caves 1986 – 2014

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**Fish Farming!**
Out of the box thinking in Bergsőe
Energy optimization @ Boliden Bergsöe

- Boliden Bergsöe in Landskrona recycles more than 70 ktons of used batteries.

- In addition, waste heat from the processes heats parts of the nearby town's heating network, equivalent to 2500 homes.

- In January 2014 a pilot plant for fish farming was started to further benefit from the excess heat, evaluate the potential for a full scale facility as well as build competence.
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