The Impact of China’s ‘New Normal’ on the Global Copper, Lead Zinc and Nickel Market

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International Copper Study Group
International Nickel Study Group

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London, United Kingdom, 13 October 2015
China’s ‘New Normal’

- Slower but better quality growth
- Rebalancing and diversifying economy
- Shift to consumer-led demand
- Focus on the environment and sustainability
- More equitable distribution of benefits
- Importance of innovation emphasised
INTERNATIONAL STUDY GROUPS

INTRODUCTION

- Shared headquarters in Lisbon, Portugal, since 2006
- Intergovernmental organizations consisting of member governments plus the European Union representing metals producing and using countries
- **International Lead and Zinc Study Group**: established in 1959, has presently 30 members
- **International Copper Study Group**: established in 1992, has presently 24 members
- **International Nickel Study Group**: established in 1990, has presently 15 members
STUDY GROUPS
MAIN OBJECTIVES & FUNCTIONS

➢ To conduct **consultations** and **exchanges of information** on the international copper, nickel, lead & zinc economies.

➢ To improve **statistics** on these metals.

➢ To increase **market transparency**.

➢ To undertake **studies** on issues of interest to the Groups.

➢ To consider special problems or difficulties that exist or may arise in these **metal’s international economies**.

The Study Groups endeavour to provide its membership with the most accurate, comprehensive and timely **information** on capacities, production, usage, trade, stocks, prices, technologies, research and development, and other areas that may influence the supply and demand for **copper, nickel, lead & zinc**.
STUDY GROUPS
FORUMS FOR DISCUSSION

- **Markets**: forecasts of supply and demand for metals a year ahead
- **Trade**: monitoring of international trade in metals
- **Environmental policy**: sharing information on approaches to regulation
- **Industry Advisory Panel**: metals industry executives provide input to member governments
- Invite **observer countries, industry and observer organizations** such as UNCTAD, World Bank, UNIDO, Common Fund for Commodities and metals associations
ICSG Membership

- Membership open to any country involved in copper production, usage, or trade.
- 24 member governments (>80% of global copper industry)
ICSG MAIN PUBLICATIONS/OUTPUTS

**Copper Bulletin** (monthly): includes annual and monthly statistics, by country, on copper mine, smelter, refined and semis production, copper usage and trade, as well as stocks and exchange prices, providing a global view of supply and demand.

**Statistical Yearbook**: As above, covering the past 10 years.

**Monthly Press Release** on the state of the copper market (to be included in the email distribution list please contact mail@icsg.org)

**World Copper Market Forecast**: Prepared twice a year for the following two years.

**Copper Factbook**: The Factbook provides a broad overview of all facets of copper, from production to trade, usage, recycling and more. It is designed to promote copper and educate readers about the importance and contribution of copper to society. Available in ICSG Website, in PDF and in hard copies.
Directory of Copper Mines & Plants (semi-annual): The Directory of Copper Mines and Plants highlights current capacity and provides a five year outlook of forecasted capacity for over 1,000 existing and planned copper mines, smelters and refineries on a country by country basis. Salient details for each operation are included and the Directory separates operations between Operating, Developing, Exploration and Feasibility stages.

Directory of Copper & Copper Alloy Fabricators - First Use (annual): This directory provides a global overview of companies and plants involved in the first use of copper. First users are semis fabricators that process refinery shapes into semi-finished copper & copper alloy products. The Directory covers wire rod plants, ingot makers, master alloy plants, brass mills, and electrodeposited copper foil mills.

ICSG Online Statistical Database: The ICSG maintains one of the world's most complete historical and current databases with statistics on copper production capacities, data on copper production, consumption, stocks, prices, recycling and trade for copper products. The database is accessed via ICSG website. Specific data extraction tools enable users to download the data they require with the layout best suited for their analysis into an Excel spreadsheet.
ILZSG Membership

- Membership open to any country involved in lead and/or zinc production, usage, or trade.
- 30 members (>85% of global lead/zinc industry):

- Australia
- Belgium
- Brazil
- Bulgaria
- Canada
- China
- Finland
- France
- Germany
- India
- Iran
- Ireland
- Italy
- Japan
- Korea Rep.
- Mexico
- Morocco
- Namibia
- Netherlands
- Norway
- Peru
- Poland
- Portugal
- Russian Fed.
- Serbia
- Sweden
- Thailand
- Turkey
- United States
- European Community
ILZSG Main Publications

- Lead and Zinc Interactive Mine and Smelter Database
- Lead and Zinc New Mine and Smelter Projects 2015
- Zinc Recovery from Electric Arc Furnace (EAF) Dust 2015
- Lead-Acid Industrial Batteries 2015
- The Chinese Primary and Secondary Lead Metal Sector 2014
- Environment and Health Controls on Lead 2014
- Environment and Health Controls on Zinc 2014
- Risk Factors in Developing Mineral and Metal Projects 2014
- World Directory: Primary & Secondary Zinc Plants 2014
- The By-Products of Copper, Zinc, Lead and Nickel
- China Lead Acid Battery Market (prepared for ILZSG by BGRIMM)
- China Zinc Recycling Industry (prepared for ILZSG by BGRIMM)
INSG Member Countries

- Australia
- Brazil
- Cuba
- European Union
- Finland
- France
- Germany
- Greece
- Italy
- Japan
- Norway
- Portugal
- Russian Federation
- Sweden
- United Kingdom
INSG Main Publications

- World Nickel Statistics - Monthly Bulletin and Yearbook
  (includes access to Online Statistical Database)
- World Directory of Nickel Production Facilities 2015 (July 2015)
- Primary Nickel Usage: New Frontiers in China (March 2015, prepared for INSG by Antaike)
- Nickel – A Surface Technology Material 2014 (July 2014, prepared for INSG by Heinz Pariser)
- China's Nickel Mine and Refined Nickel Production 2014 (March 2014, prepared for INSG by BGRIMM)
- Cobalt as a By-Product of Copper and Nickel (March 2014)
- Report on Taxation and Fiscal Incentives of Copper, Zinc, Lead And Nickel (January 2014)
- Report on Risk Factors (January 2014)
- Other publications

Up to 50% discount
For companies based in member countries
Review and Outlook for Copper
2014 World Copper Reserves & Mine Production
(contained copper metal)

Total Resources
(identified and undiscovered\(^1\))
5,600 million tonnes (Mt)

Identified Resources
2,100 Mt

Reserves
700 Mt

Mine Capacity
21.7 Mt

Mine Production
18.7 Mt

Not to scale

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1/ Undiscovered resources not including deep sea nodules and land-based and submarine massive sulfides
Source: USGS (resources/reserves data) and ICSG (capacity/production data)
Despite increased consumption of copper produced from ore in recent years, increases in reserves have grown more, and there is more copper available to the world than at any other time in the past.

Chile, Australia and Peru account for half of the current World Copper Reserves reported by USGS.
World Copper Mine Production, 1900-2015
(thousand metric tonnes copper)
Source: ICSG

Average annual grow rate in the last century: 4%
Average annual grow rate in the last decade: 2.3%
Average annual grow rate in this decade: 2.8%

Source: ICSG
Market changed substantially since last 5 months

- FALLING COPPER PRICE
- PRODUCERS REACTING with PRODUCTION CUTS
- EXTREME WEARTHER CONDITIONS (El Niño impact)
- CHINA SLOWDOWN (*New Normal?*)
- WORLD ECONOMIC GROWTH REVISED DOWNWARDS

Issues led to revisions in previous forecasts for 2015/2016
Market changed substantially in last 5 months

**FALLING COPPER PRICE**

- The Copper price fell from 6200US$/t at the April meeting to around 5000US$/t currently
- It reached the lowest level since Jul 2009 on 24\(^{th}\) August (4888US$/t)
- The 2015 average to date (5700$/t) is the lowest since 2009 and prices declined by 20% since the beginning of the year

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**Cu price since ICSG April Meeting**

**Cu price since 2008 crisis**
Market changed substantially in last 5 months

PRODUCERS REACTION TO FALLING COPPER PRICES:
- Reduction in capital expenditure
- Cuts in planned production
- Savings in operating, administrative and exploration costs
- Deferral in project investment
- Temporary closures
- Increased efforts to avoid further decline in company share prices

Source: ICSG
Market changed substantially in last 5 months

<table>
<thead>
<tr>
<th>Country</th>
<th>Mine</th>
<th>Operator</th>
<th>Process</th>
<th>2014 production (kt Cu)</th>
<th>Announcement date</th>
<th>Action</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>Miami</td>
<td>Freeport</td>
<td>SX-EW</td>
<td>26</td>
<td>end Aug 15</td>
<td>closure</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>Tyrone</td>
<td>Freeport</td>
<td>SX-EW</td>
<td>43</td>
<td>end Aug 15</td>
<td>50% cut mining rates</td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>El Abra</td>
<td>Freeport/ Codelco</td>
<td>SX-EW</td>
<td>166</td>
<td>end Aug 15</td>
<td>50% reduction of mining and stacking rates</td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>Collahuasi</td>
<td>Anglo American/ Glencore</td>
<td>Concs &amp; SX-EW</td>
<td>445 &amp; 25</td>
<td>end Sep 15</td>
<td>Cut in SX-EW production of 30ktpy</td>
<td>NA</td>
</tr>
<tr>
<td>USA</td>
<td>Ray</td>
<td>Asarco</td>
<td>Concs &amp; SX-EW</td>
<td>53 &amp; 29</td>
<td>end Aug 15</td>
<td>40% cut in output (indefinite shutdown of concentrator and reduction in stripping for leach operation)</td>
<td>adjustments may be made as market conditions warrant.</td>
</tr>
<tr>
<td>Congo</td>
<td>Katanga (Kamoto)</td>
<td>Glencore</td>
<td>SX-EW</td>
<td>160</td>
<td>Sep-15</td>
<td>suspension of operations</td>
<td>18 month</td>
</tr>
<tr>
<td>Zambia</td>
<td>Mopani mines</td>
<td>Glencore</td>
<td>Concs &amp; SX-EW</td>
<td>110</td>
<td>Sep-15</td>
<td>suspension of operations</td>
<td>18 month</td>
</tr>
<tr>
<td>Zambia</td>
<td>Mopani refinery</td>
<td>Glencore</td>
<td>Electrolytic/ SX-EW</td>
<td>185</td>
<td>Sep-15</td>
<td>suspension of operations (might continue concs toll smelting and refined production)</td>
<td>18 month</td>
</tr>
<tr>
<td>Namibia</td>
<td>Otjihase and Matchless</td>
<td>Weatherly</td>
<td>Concs</td>
<td>6</td>
<td>Sep-15</td>
<td>closure</td>
<td>to be reviewed when market conditions improve</td>
</tr>
<tr>
<td>Botswana</td>
<td>Mowana</td>
<td>African Copper</td>
<td>Concs</td>
<td>10</td>
<td>Mar-15</td>
<td>C&amp;M</td>
<td>NA</td>
</tr>
</tbody>
</table>

Source: ICSG
Market changed substantially since last 5 months

EXTREMER WEARTHER CONDITIONS (El Niño impact)

- **Drought** in the central part of Chile affecting the mining industry after operations were affected by severe rain at the beginning of 2015
- **Los Bronces** total net impact of water constraints in 1H2015 is 28kt Cu.
- **Centinela** copper in concentrate production for 1H2015 was 4.7% lower reflecting lower throughput as a result of the heavy rains in the Atacama Desert in March.
- **Los Pelambres** production impacted by protesters that blocked access to the mine for ten days seeking action to help alleviate the current drought conditions in the region. (-15kt Cu)
- In 3Q2015 **Grasberg** milling operations impacted by a reduction in process water available under El Nino conditions (-10kt Cu)
- **OK Tedi** mine closed in August as dry weather is preventing navigation in the Fly river to access the mine (-30kt Cu)
- In Zambia reduced rainfall lead to electricity shortage with power being reduced by 30% to the mining industry. Mines and plants operating at reduced levels, **Sentinel** new mine project process plant shut in July

Kt= Thousand Tons,
CHINA DATA WEAKER THAN EXPECTED

China represents 45% of the world demand (1% change in Chinese usage growth is currently equivalent to around 100kt)

- August PMI fell to the lowest level (47 points) since March 2009
- Worse than expected industrial copper demand in July and August led analysts to revise downwards usage growth rates
- Lower electronic products exports, lower aircon sales, slower growth in auto production, lower auto production, sluggish house market
- But strong growth is seen in the infrastructure and power industry as China is accelerating spending in power distribution

<table>
<thead>
<tr>
<th>Forecast Revisions</th>
<th>China Industrial Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ICSG Survey avg</td>
</tr>
<tr>
<td>Forecast</td>
<td>2015</td>
</tr>
<tr>
<td>April 15</td>
<td>4.2%</td>
</tr>
<tr>
<td>Sep 15</td>
<td>3.7%</td>
</tr>
</tbody>
</table>
But beside production cuts/temporary closures ... some new mines are expected to start/expand in 2015-2016

<table>
<thead>
<tr>
<th>Country</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armenia</td>
<td>Teghout 30kt (Conc.), started Jan 2015</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>Red Chris 40kt (conc), production Feb 2015</td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>Antucoya 85kt (SXEW)</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td></td>
<td>JiaMa phase II 15kt exp in 2016 (Conc.), Shaxi 16kt (Conc.), Duobaoshan 10kt exp (Conc.), Zjinshang 18kt exp (conc)</td>
</tr>
<tr>
<td>DRC</td>
<td>Kalumines 40kt (conc)</td>
<td>Sicomines 50kt (SX-EW), Kipoi 25kt exp (SXEW), Frontier 20kt exp (conc)</td>
</tr>
<tr>
<td>Iran</td>
<td></td>
<td>Darehzar 26kt (Conc.)</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td></td>
<td>Bozshakol 100kt (Conc.), Aktogay 15kt (SXEW)</td>
</tr>
<tr>
<td>Mexico</td>
<td>Boleo 56kt (SXEW),</td>
<td>Buenavista new SXEW III plant started 2014 reaching full cap 120kt in 1Q2016 (SXEW), Concentrator 188kt exp in 4Q15 (Conc)</td>
</tr>
<tr>
<td>Myanmar</td>
<td>Monywa exp 40 to 50kt (SX-EW)</td>
<td>Letpadaung 100kt (SXEW)</td>
</tr>
<tr>
<td>Namibia</td>
<td>Tschudi 17kt (SXEW)</td>
<td></td>
</tr>
<tr>
<td>Peru</td>
<td>Constanza 120kt (Conc.) started end 2014 with production in 2015</td>
<td>Las Bambas 400kt (Conc.), Cerro Verde II 270ktpy exp (conc)</td>
</tr>
<tr>
<td>Romania</td>
<td>Baita Bihor 25kt (Conc.)</td>
<td></td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td></td>
<td>Jabal Sayid 45kt (Conc.)</td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td>Rio Tinto Mines 37kt (Conc.)</td>
</tr>
<tr>
<td>USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zambia</td>
<td>Sentinel 250kt (conc)</td>
<td>Chambishi 50kt expansion (Conc.),</td>
</tr>
</tbody>
</table>

Kt= Thousand Tons,

Source: ICSG Directory of Copper Mines and Plants
Recent supply constrains referred led to a downward revision in mine production growths since last ICSG forecast (April)

After balancing supply constrains and additional output from new or expanded projects, ICSG expected that world copper mine production might grow by around 1% in 2015 (4% expected in April) and 4% 2016 (5% in April), reaching 18.7Mt copper this year and increasing to 19.5Mt in 2016.

Most of the projects starting in 2014 and also in 2015/2016 are producing concentrates which combined with the recovery in concentrate production in Indonesia will lead to higher growth rates in world concentrate production.

In 2015, Indonesia and Peru will be the biggest contributors to mine production growth with production declining in Chile, the USA, Zambia and the DRC.

In 2016 Indonesia, Chile, Peru and Zambia will be the biggest contributors to growth.

DRC 2015/2016 output impacted by announced production cuts.

Source: ICSG
- Chile to continue the biggest copper mine producer in the world
- United States losing share and China and Peru increasing its share
- Africa maintaining the same share at around 10% but more than doubling production to 2Mt copper
- China share increased from 3% in 1990 to 9% in 2014 and in 2016 will be sharing with Peru the 2\textsuperscript{nd} place as biggest world producer

Source: ICSG
Chinese refined production is continuing its expansion trend although at more “New normal” lower growth levels than the 14% average annual growth of the last three years (avg 6% for 2015/2016)

China will still remain by far the biggest contributor to refined production growth in 2015/2016

Chile and the DRC production expected to decline due to decreases in SX-EW output

SX-EW expansion in Zambia and Mexico contributing to world growth

After strong growth of 7% in 2014, world copper refined production expected to grow by around 1% and 3% respectively in 2015 and 2016

Source: ICSG
Distribution of Copper Refined Production by Country (1990 vs 2016)

Strong growth in Chinese refined production, up from 5% of world share in 1990 to 36% by 2016

United States and Japan losing share

Africa maintaining the same share at around 6% but more than doubling production to 1.4Mt copper

Source: ICSG
Following growth of around 7% in 2014, ICSG expects world apparent refined usage in 2015 to decline by 1.2%. This is mainly because apparent demand in China is expected to remain essentially flat, although underlying “real” demand growth in China is estimated by others at around 3-4% (lower than the 4.5-5% anticipated growth in April). On the other hand, usage in the rest of the world is expected to decline by 1.5% impacted lower growth in the world economy.

For 2016, the growth in world apparent refined usage is expected at around 3% with underlying Chinese industrial demand growth expected at around 4%. Usage in the rest of the world is expected to increase by about 2%.

Source: ICSG
Distribution of Copper Refined Usage by Country (1990 vs 2016)

- Strong growth in Chinese apparent refined usage, up from 5% of world share in 1990 to around 49% by 2016
- EU share in world usage declining from 29% in 1990 to 12% in 2016
- United States share in world usage declining from 20% in 1990 to 8% in 2016
- Japan share in world usage declining from around 15% in 1990 to 5% in 2016

Source: ICSG
Major Uses of Copper: Usage by Region and End Use Sector, 2014

Basis: copper content, thousand metric tonnes
Source: International Wrought Copper Council (IWCC) and International Copper Association (ICA)

Americas 14%
Europe 19%
ROW 5%
Asia 62%

Industrial 12%
Transport 12%
Infrastructure 15%
Building Construction 30%
Equipment 31%
ICSG projections for 2015 indicate that the market should essentially remain balanced, while in 2016 ICSG forecasts a small deficit of around 130Kt as demand growth outpaces production growth. This compares with a surplus of 360Kt and 230Kt for 2015 and 2016, respectively, forecast at our April 2015 meeting. The revisions reflect substantial changes in market conditions since April 2015. Although a downward revision has been made to global usage in view of lower than anticipated growth in China, larger downward adjustments have been made to production as a result of recent announcements of production cuts.

The International Copper Study Group recognizes that numerous factors create significant uncertainty, and that the global market balances could vary from those projected currently.

ICSG World Copper forecast (Oct 2015) – summary table

<table>
<thead>
<tr>
<th>REGIONS</th>
<th>MINE PRODUCTION</th>
<th>REFINED PRODUCTION</th>
<th>REFINED USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>1,945</td>
<td>1,877</td>
<td>2,006</td>
</tr>
<tr>
<td>N.America</td>
<td>2,595</td>
<td>2,520</td>
<td>2,741</td>
</tr>
<tr>
<td>Latin America</td>
<td>7,562</td>
<td>7,705</td>
<td>8,167</td>
</tr>
<tr>
<td>Asean-10 / Oceania</td>
<td>1,726</td>
<td>1,926</td>
<td>2,270</td>
</tr>
<tr>
<td>Asia ex Asean/CIS</td>
<td>2,363</td>
<td>2,407</td>
<td>2,564</td>
</tr>
<tr>
<td>Asia-CIS</td>
<td>578</td>
<td>616</td>
<td>679</td>
</tr>
<tr>
<td>EU</td>
<td>845</td>
<td>854</td>
<td>873</td>
</tr>
<tr>
<td>Europe Others</td>
<td>914</td>
<td>925</td>
<td>935</td>
</tr>
<tr>
<td>TOTAL</td>
<td>18,527</td>
<td>18,830</td>
<td>20,234</td>
</tr>
<tr>
<td>World adjusted 1/ 2/</td>
<td>18,527</td>
<td>18,751</td>
<td>19,542</td>
</tr>
<tr>
<td>% change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World Refined Balance</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1/ Based on a formula for the difference between the projected copper availability in concentrates and the projected use in primary refined production;
2/ Allowance for supply disruptions based on average ICSG forecast deviations for previous 5 years.
The data presented in ICSG Directory of Copper Mines and Plants reflects copper production capacity or capability, not necessarily meaning effective production rates or production forecasts. Actual production may in fact differ significantly from capacity as many factors may negatively impact output levels.

World mine production capacity expected to grow to 27.4 Mt of copper in 2018 from 21.7 Mt in 2014.

Concentrate to grow to 21.7Mt and SX-EW to 5.7 Mt.
Until 2018, 2.9 Mt additional capacities will come from expansion/ramp-up output at mines currently operating (including mines that started in 2014) and around 2.8 Mt will originate in new projects (including 2.2 Mt from projects already in development)
South America will continue to be the region with the largest copper mining production capacity and will maintain it’s share in world copper production capacity at around 38%. However much of this is owed to the rapid expansion of Peru copper mining industry.

Africa and Asia are increasing their share from 5% and 17% in 2000 to 13% and 22% by 2018 respectively due to the start-up of new projects.
Chile will retain its position as the biggest copper mine producer in the world but Peru is the leading contributor to world growth.
In the last decade we have observed a geographical enlargement of the copper mining industry.

There has been growing interest in developing copper projects in countries that up to now are not mining copper or that had limited production.
Additional output is also arising in countries that have only started copper mine during the last decade or early this decade.

Source: ICSG Directory of Copper Mines and Plants – June 2015
Growing interest in developing projects in countries that up to now are not mining copper

Source: ICSG Directory of Copper Mines and Plants – June 2015
COPPER MINE PROJECTS (cap≥110Ktpy Cu)

Projects in this box planned for after 2023

Source: ICSG Directory of Copper Mines and Plants – June 2015

Total annual Capacity of Listed Projects in this chart: 9.5Mt Cu
Capacity Expansion at Selected Mines

Expanded capacity at listed mines = 2.7 Mt Cu

Source: ICSG Directory of Copper Mines and Plants – June 2015
Looking into the future mining companies are starting now to look at possible offshore deep-sea minerals exploration. The oceans represent around 70% of the world surface and its floor is believed to contain important mineral resources among which are copper, zinc, nickel, manganese, gold and silver.

To meet increasing copper demand, the discovery and exploration of new resources will be crucial and sea floor deposits could represent an important opportunity for additional supply.

However, the challenge is to be able to exploit those deposits efficiently and turn them into economically-viable operations.

ICSG identified three off-shore copper projects that could be producing in the near future. Clipperton Fracture Zone in the International Waters of the Pacific Ocean, between Hawaii and Mexico, Atlantis II Bacin Project in Red Sea, and Solwara 1 project located in the Bismarck Sea, Papua New Guinea.

Other zones where interest in exploration opportunities has risen are mid-Atlantic Ridge and Southwest Indian Ridge.
China will continue to increase its smelting capacity through expansions and new projects.

- Indonesia's new mining law on banning ore exports leading to the development of new smelter projects in the country.

- In most countries, the increase in smelting production capacity until 2018 is mainly due to expansions at existing plants but some new smelters projects are planned in China, Indonesia, Iran, Mexico, and Zambia.

- Beyond 2018, a series of potential smelter projects have been announced with no firm confirmation yet.

Source: ICSG Directory of Copper Mines and Plants – June 2015
- Until 2018, world copper refinery capacity expected to grow by 2.9 Mt to 30.2 Mt.
- 2 Mt of the expansion expected to come from electrolytic refineries and almost 1 Mt from electrowinning capacity.
- Supremacy of Asia over the other regions (currently 47% of total world capacity)
- Africa copper refined capacity almost tripled from 2000 to 2014 and is expected to increase further until 2018 (all in the form of electrowinning production)
China is by far the biggest contributor to the growth with a strong increase of around 1Mt, representing 38% of the world growth in the period.
The DRC and Mexico will be important contributors too.
These 3 countries represent almost 70% of the world growth.

Source: ICSG Directory of Copper Mines and Plants – June 2015
The data presented in ICSG Directory of Copper Mines and Plants reflects copper production capacity or capability, not necessarily meaning effective production rates or production forecasts.

Actual production may in fact differ significantly from capacity as many factors may negatively impact output levels.

Economic and market conditions, as well as technological and business factors, may also result in production levels that vary from the indicated capacity: production levels may be affected by operational failures, unforeseen cuts in production and closures or by the delay or cancellation of projects.

Source: ICSG Directory of Copper Mines and Plants – June 2015
Review and Outlook for Nickel
Plenty of nickel reserves available to the world

Resources:
130 million tonnes (Mt)

Reserves
81 Mt

Mine Production
2.1 Mt

Source: USGS, INSG 2014
World Nickel Ore Production

2006

- Europe: 23%
- Americas: 33%
- Africa: 5%
- Asia: 18%
- Indonesia: 10%
- Philippines: 6%
- Other Asia: 5%

2016 f

- Oceania: 24%
- Asia: 41%
- Indonesia: 6%
- Philippines: 19%
- Other Asia: 7%
- Europe: 12%
- Americas: 25%
- Africa: 7%

(f) forecast October 2015
World Primary Nickel Production (1/2)
in 1000 tonnes

(f) forecast October 2015
World Primary Nickel Production (2/2)

2006

- Europe: 38%
- Americas: 23%
- Asia: 21%
- Africa: 4%
- China P.R.: 10%
- Other Asia: 13%

2016 f

- Europe: 23%
- Americas: 16%
- Africa: 5%
- Oceania: 11%
- China P.R.: 28%
- Other Asia: 17%

(f) forecast October 2015
NPI Production in China (Kt)

AVG. 2014 = 39kt/month

AVG. 2015 = 34kt/month

Source: Antaike, SMM, INSG estimates
China NPI production and Imports of Nickel Ore and Concentrates

Source: China Customs, INSG estimates
China NPI production and Imports of Ferro-nickel

Source: China Customs, INSG estimates
China NPI production and Imports of Unwrought Nickel

Source: China Customs, INSG estimates
World Primary Nickel Usage (consumption) (1/2)

(f) forecast October 2015
World Primary Nickel Usage (consumption) (2/2)

2006

- Europe: 35%
- Americas: 13%
- Asia: 45%
- Other Asia: 31%
- Oceania: 0.2%

2016 f

- Asia: 70%
- Europe: 18%
- Americas: 10%
- Other Asia: 19%
- Oceania: 0.1%

(f) forecast October 2015
First-use of nickel - 2014

- Stainless Steel: 66%
- Nickel base alloys: 10%
- Alloy steel: 8%
- Plating: 9%
- Foundry: 3%
- Other: 4%

Source: Heinz Pariser
World Stainless Steel Melting Production

Source: ISSF
# Nickel projects
## Directory 2015

**Capacity (Ni content, t/y)**

<table>
<thead>
<tr>
<th></th>
<th>Ore &amp; Concentrate</th>
<th>Intermediate Products</th>
<th>Refined products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Committed Developments</td>
<td>211,500</td>
<td>210,650</td>
<td>782,000</td>
</tr>
<tr>
<td>Likely Project Developments</td>
<td>220,300</td>
<td>58,400</td>
<td>114,000</td>
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<td>Potential Project Developments</td>
<td>240,700</td>
<td>46,600</td>
<td>488,000</td>
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<tr>
<td>NPI Committed Developments</td>
<td>-</td>
<td>-</td>
<td>127,800</td>
</tr>
<tr>
<td>NPI Likely / Potential Developments</td>
<td>-</td>
<td>-</td>
<td>249,000</td>
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</tbody>
</table>
## New Nickel Capacity

<table>
<thead>
<tr>
<th>Project Name / Country</th>
<th>Product</th>
<th>Mode</th>
<th>Estimated Production</th>
<th>Projected Total Production</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambatovy / Madagascar</td>
<td>Class I</td>
<td>Ramp Up</td>
<td>≈ 50,000</td>
<td>60,000</td>
<td>Open market</td>
</tr>
<tr>
<td>Long Harbour / Canada</td>
<td>Class I</td>
<td>Ramp Up</td>
<td>≈ 15,000</td>
<td>50,000</td>
<td>Mainly replacement</td>
</tr>
<tr>
<td>Tagaung Taung / Myanmar</td>
<td>FeNi</td>
<td>Ramp Up</td>
<td>≈ 21,000</td>
<td>23,000</td>
<td>China</td>
</tr>
<tr>
<td>Koniambo / New Caledonia</td>
<td>FeNi</td>
<td>Ramp Up</td>
<td>≈ 10,000</td>
<td>40,000</td>
<td>Open market</td>
</tr>
<tr>
<td>Onça Puma / Brazil</td>
<td>FeNi</td>
<td>Ramp Up</td>
<td>≈ 25,000</td>
<td>28,000</td>
<td>Open market</td>
</tr>
<tr>
<td>Barro Alto / Brazil</td>
<td>FeNi</td>
<td>Ramp Up</td>
<td>≈ 20,000</td>
<td>40,000</td>
<td>Open market</td>
</tr>
<tr>
<td>Goro / New Caledonia</td>
<td>Semi / Class I</td>
<td>Ramp Up</td>
<td>≈ 20,000</td>
<td>60,000</td>
<td>Australia &amp; China</td>
</tr>
<tr>
<td>Ramu / PNG</td>
<td>Semi</td>
<td>Ramp Up</td>
<td>≈ 26,000</td>
<td>30,000</td>
<td>China &amp; Other</td>
</tr>
<tr>
<td>Raventhorpe / Australia</td>
<td>Semi</td>
<td>Ramp Up</td>
<td>≈ 26,000</td>
<td>39,000</td>
<td>Australia &amp; Other</td>
</tr>
<tr>
<td>Taganito / The Philippines</td>
<td>Semi</td>
<td>Ramp Up</td>
<td>≈ 30,000</td>
<td>35,000</td>
<td>Japan</td>
</tr>
<tr>
<td>Ban Phuc / Vietnam</td>
<td>Conc.</td>
<td>Ramp Up</td>
<td>≈ 8,000</td>
<td>10,000</td>
<td>China</td>
</tr>
<tr>
<td>Santa Rita / Brazil</td>
<td>Conc.</td>
<td>Ramp Up</td>
<td>≈ 20,000</td>
<td>25,000</td>
<td>Brazil &amp; Finland</td>
</tr>
<tr>
<td>Eagle / USA</td>
<td>Conc.</td>
<td>Ramp Up</td>
<td>≈ 26,000</td>
<td>26,000</td>
<td>Open market</td>
</tr>
<tr>
<td>Kevitsa / Finland</td>
<td>Conc.</td>
<td>Ramp Up</td>
<td>≈ 6,000</td>
<td>10,000</td>
<td>Open market</td>
</tr>
</tbody>
</table>

**Note:** no NPI projects included.
# World Nickel Ore Production 2013 to 2016 (f)

<table>
<thead>
<tr>
<th>Area</th>
<th>2013</th>
<th>2014</th>
<th>% change</th>
<th>2015 (f)</th>
<th>% change</th>
<th>2016 (f)</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>120.1</td>
<td>136.7</td>
<td>13.8</td>
<td>145.2</td>
<td>6.2</td>
<td>153.2</td>
<td>5.5</td>
</tr>
<tr>
<td>America</td>
<td>500.9</td>
<td>510.9</td>
<td>2.0</td>
<td>545.0</td>
<td>6.7</td>
<td>567.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Asia</td>
<td>1264.6</td>
<td>719.0</td>
<td>-43.1</td>
<td>685.2</td>
<td>-4.7</td>
<td>713.0</td>
<td>4.1</td>
</tr>
<tr>
<td>Europe</td>
<td>317.4</td>
<td>325.2</td>
<td>2.5</td>
<td>278.4</td>
<td>-14.4</td>
<td>279.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Oceania</td>
<td>409.5</td>
<td>443.8</td>
<td>8.4</td>
<td>445.9</td>
<td>0.5</td>
<td>530.6</td>
<td>19.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2612.5</strong></td>
<td><strong>2135.6</strong></td>
<td><strong>-18.3</strong></td>
<td><strong>2099.7</strong></td>
<td><strong>-1.7</strong></td>
<td><strong>2243.2</strong></td>
<td><strong>6.8</strong></td>
</tr>
</tbody>
</table>

(f) forecast October 2015

in 1000 tonnes
# World Primary Nickel Production 2013 to 2016 (f)

## Table: World Primary Nickel Production 2013 to 2016 (f)

<table>
<thead>
<tr>
<th>Area</th>
<th>2013</th>
<th>2014</th>
<th>% change</th>
<th>2015 (f)</th>
<th>% change</th>
<th>2016 (f)</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>59.0</td>
<td>75.2</td>
<td>27.5</td>
<td>84.3</td>
<td>12.1</td>
<td>93.0</td>
<td>10.3</td>
</tr>
<tr>
<td>America</td>
<td>293.3</td>
<td>294.8</td>
<td>0.5</td>
<td>295.9</td>
<td>0.4</td>
<td>306.0</td>
<td>3.4</td>
</tr>
<tr>
<td>Asia</td>
<td>922.4</td>
<td>940.5</td>
<td>2.0</td>
<td>904.5</td>
<td>-3.8</td>
<td>877.5</td>
<td>-3.0</td>
</tr>
<tr>
<td>Europe</td>
<td>497.8</td>
<td>483.5</td>
<td>-2.9</td>
<td>462.9</td>
<td>-4.3</td>
<td>445.7</td>
<td>-3.7</td>
</tr>
<tr>
<td>Oceania</td>
<td>189.9</td>
<td>199.8</td>
<td>5.2</td>
<td>206.4</td>
<td>3.3</td>
<td>220.0</td>
<td>6.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1962.4</strong></td>
<td><strong>1993.8</strong></td>
<td><strong>1.6</strong></td>
<td><strong>1954.0</strong></td>
<td><strong>-2.0</strong></td>
<td><strong>1942.2</strong></td>
<td><strong>-0.6</strong></td>
</tr>
</tbody>
</table>

*in 1000 tonnes*

(f) forecast October 2015
# World Primary Nickel Usage 2013 to 2016 (f)

<table>
<thead>
<tr>
<th>Area</th>
<th>2013</th>
<th>2014</th>
<th>% change</th>
<th>2015 (f)</th>
<th>% change</th>
<th>2016 (f)</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>22.9</td>
<td>21.4</td>
<td>-6.6</td>
<td>22.6</td>
<td>5.6</td>
<td>23.8</td>
<td>5.3</td>
</tr>
<tr>
<td>America</td>
<td>174.8</td>
<td>181.9</td>
<td>4.1</td>
<td>182.3</td>
<td>0.2</td>
<td>192.4</td>
<td>5.5</td>
</tr>
<tr>
<td>Asia</td>
<td>1233.6</td>
<td>1303.0</td>
<td>5.6</td>
<td>1347.8</td>
<td>3.4</td>
<td>1392.6</td>
<td>3.3</td>
</tr>
<tr>
<td>Europe</td>
<td>350.8</td>
<td>354.1</td>
<td>0.9</td>
<td>349.7</td>
<td>-1.2</td>
<td>353.4</td>
<td>1.1</td>
</tr>
<tr>
<td>Oceania</td>
<td>2.7</td>
<td>2.7</td>
<td>0.0</td>
<td>2.7</td>
<td>0.0</td>
<td>2.8</td>
<td>3.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1784.8</strong></td>
<td><strong>1863.1</strong></td>
<td><strong>4.4</strong></td>
<td><strong>1905.1</strong></td>
<td><strong>2.3</strong></td>
<td><strong>1965.0</strong></td>
<td><strong>3.1</strong></td>
</tr>
</tbody>
</table>

(f) forecast October 2013

in 1000 tonnes
The impact of Asia and China
Nickel Usage (Consumption)

Asia: 47%
China: 15%

China: 70%
Asia: 51%
Final Remarks

• China’s stainless industry has expanded rapidly in recent years. China economy is moving from investment driven growth to a more sustainable model centred on consumption, innovation and price mechanism. Key policy changes are: curb overcapacity, protect the environment, allocate resources according to the price mechanism. This will have a medium-long term effect on stainless steel production.

• The increase of NPI production in China has been in recent years the real game changer in the nickel market. Its gradual reduction due to the Indonesian ban on ore export will require the use of alternative raw material sources, at least in the short term.

• What effect will the investments in new downstream projects in Indonesia have on the world nickel supply/demand balance and ultimately on the nickel price in coming years?
Review and Outlook for Lead & Zinc
World Lead Reserves 2014

Resources:
>2000 million tonnes (Mt)

Reserve Base
170 Mt

Reserves
87 Mt

Mine Production
5.0 Mt

Sources: USGS, ILZSG

contained lead metal
Despite increased consumption of lead produced from ore in recent years, increases in reserves have grown more, and there is more lead available to the world than at any other time in the past.

Source: USGS
World Zinc Reserves 2014

Resources: about 1900 million tonnes (Mt)

Reserve Base
480 Mt

Reserves
230 Mt

Mine Production
13.3 Mt

Sources: USGS, ILZSG

contained zinc metal
World Zinc Reserves
2014 Breakdown

• Despite increased consumption of zinc produced from ore in recent years, increases in reserves have grown more, and there is more zinc available to the world than at any other time in the past

Source: USGS
Lead Mine Supply
1966-2016f

Source: ILZSG
Breakdown of Lead Mine Production By Continent, 2014

- Asia: 54%
- America: 21%
- Oceania: 15%
- Europe: 8%
- Africa: 2%

Source: ILZSG
Distribution of Lead Mine Supply

2004

- Europe: 12.1%
- Mexico: 5.2%
- Peru: 8.8%
- USA: 14.8%
- Canada: 4.8%
- Australia: 21.1%
- Other: 11.8%
- China: 21.4%

2014

- Europe: 8.3%
- Mexico: 5.0%
- Peru: 5.6%
- USA: 7.5%
- Canada: 0.1%
- Other: 11.3%
- Australia: 14.6%
- China: 47.7%

Source: ILZSG
# Selected Recent Lead Mine Openings and Closures

## Openings:

<table>
<thead>
<tr>
<th>Location</th>
<th>Annual Capacity*</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paroo Station, Australia</td>
<td>85,000t</td>
<td>2013</td>
</tr>
<tr>
<td>George Fisher, Australia</td>
<td>36,000t</td>
<td>2014</td>
</tr>
<tr>
<td>McArthur River, Australia</td>
<td>51,000t</td>
<td>2014</td>
</tr>
<tr>
<td>Garpenburg, Sweden</td>
<td>20,000t</td>
<td>2014</td>
</tr>
<tr>
<td>Kayar, India</td>
<td>15,000t</td>
<td>2014</td>
</tr>
</tbody>
</table>

*Pb Metal contained

## Closures:

<table>
<thead>
<tr>
<th>Location</th>
<th>Annual Capacity*</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunswick, Canada</td>
<td>-55,000t</td>
<td>2013</td>
</tr>
<tr>
<td>Paroo Station, Australia</td>
<td>-85,000t</td>
<td>2015</td>
</tr>
</tbody>
</table>

*Pb Metal contained

Source: New Mines and Smelters 2014 and 2015 Reports, ILZSG
Zinc Mine Supply
1966-2016f

Source: ILZSG
Breakdown of Zinc Mine Production By Continent, 2014

- Asia: 49%
- America: 29%
- Oceania: 12%
- Europe: 8%
- Africa: 2%

Source: ILZSG
Distribution of Zinc Mine Supply

**2004**
- Europe: 10.6%
- Canada: 8.3%
- India: 3.3%
- Peru: 14.3%
- Australia: 15.2%
- Other: 27.1%
- China: 21.3%

**2014**
- Europe: 7.7%
- Canada: 2.7%
- India: 5.3%
- Peru: 9.9%
- Australia: 11.6%
- Other: 26.1%
- China: 36.6%

Source: ILZSG
# The End of Century -
## Selected Zinc Mine Closures 2013 to 2016

<table>
<thead>
<tr>
<th>Mine</th>
<th>Annual Capacity</th>
<th>Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunswick, Canada</td>
<td>240,000t</td>
<td>2013</td>
</tr>
<tr>
<td>Perseverance, Canada</td>
<td>115,000t</td>
<td>2013</td>
</tr>
<tr>
<td>Lisheen, Ireland</td>
<td>175,000t</td>
<td>2015</td>
</tr>
<tr>
<td><strong>Century, Australia</strong></td>
<td><strong>510,000t</strong></td>
<td><strong>2015</strong></td>
</tr>
<tr>
<td>Bukowno Olkusz, Poland</td>
<td>70,000</td>
<td>2016</td>
</tr>
<tr>
<td>Skorpion, Namibia</td>
<td>154,000t</td>
<td>2016</td>
</tr>
</tbody>
</table>
## Selected Recent Zinc Mine Openings

<table>
<thead>
<tr>
<th>Mine</th>
<th>Annual Capacity (Zn contained)</th>
<th>Opened</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perkoa, Burkina Faso</td>
<td>95,000t</td>
<td>2013</td>
</tr>
<tr>
<td>Bracemac-McLeod, Canada</td>
<td>90,000t</td>
<td>2013</td>
</tr>
<tr>
<td>Valardena, Mexico</td>
<td>90,000t</td>
<td>2013</td>
</tr>
<tr>
<td>George Fisher, Australia (expansion)</td>
<td>64,000t</td>
<td>2014</td>
</tr>
<tr>
<td>McArthur River, Australia (expansion)</td>
<td>125,000t</td>
<td>2014</td>
</tr>
<tr>
<td>Kyzyl Tashtygskoe, Russia</td>
<td>90,000t</td>
<td>2014</td>
</tr>
<tr>
<td>Garpenburg, Sweden (expansion)</td>
<td>60,000t</td>
<td>2014</td>
</tr>
<tr>
<td>Pend Oreille, United States</td>
<td>44,000t</td>
<td>2014</td>
</tr>
</tbody>
</table>

Source: New Mines and Smelters 2014 and 2015 Reports, ILZSG
## Selected Committed Additions to Zinc Mine Capacity

<table>
<thead>
<tr>
<th>Mine</th>
<th>Annual Capacity (Zn contained)</th>
<th>Scheduled Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dugald River, Australia</td>
<td>210,000t</td>
<td>2017</td>
</tr>
<tr>
<td>Lady Loretta, Australia <em>(expansion)</em></td>
<td>47,000t</td>
<td>2016</td>
</tr>
<tr>
<td>Halfmile Lake, Canada</td>
<td>55,000t</td>
<td>2016</td>
</tr>
<tr>
<td>Caribou, Canada</td>
<td>42,000t</td>
<td>2015</td>
</tr>
<tr>
<td>Cerro Lindo, Peru <em>(expansion)</em></td>
<td>45,000t</td>
<td>2015</td>
</tr>
<tr>
<td>Ozernoye, Russia</td>
<td>350,000t</td>
<td>2018/19</td>
</tr>
<tr>
<td>Gamsberg, South Africa</td>
<td>250,000t</td>
<td>2018</td>
</tr>
<tr>
<td>Shalkiya, Kazakhstan</td>
<td>110,000t</td>
<td>2018</td>
</tr>
</tbody>
</table>

Source: New Mines and Smelters 2014 and 2015 Reports, ILZSG
# Selected Zinc Mine Projects Under Consideration

<table>
<thead>
<tr>
<th>Mine</th>
<th>Estimated Annual Capacity (Zinc contained)</th>
<th>Possible Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oued-Amizour (Tala Hamza), Algeria</td>
<td>164,000t</td>
<td>2019/20</td>
</tr>
<tr>
<td>San Gregorio, Peru</td>
<td>105,000t</td>
<td>2017</td>
</tr>
<tr>
<td>Selwyn (Howards Pass), Canada</td>
<td>100,000t</td>
<td>2020</td>
</tr>
<tr>
<td>Izok Lake, Canada</td>
<td>80,000t</td>
<td>2018</td>
</tr>
<tr>
<td>Bisha, Eritrea</td>
<td>90,000t</td>
<td>2017</td>
</tr>
<tr>
<td>Gergarub, Namibia</td>
<td>100,000t</td>
<td>2018</td>
</tr>
<tr>
<td>Khnaiguiyah, Saudi Arabia</td>
<td>80,000t</td>
<td>2018</td>
</tr>
<tr>
<td>Mehdiabad, Iran</td>
<td>400,000t</td>
<td>2019</td>
</tr>
<tr>
<td>Citronen, Greenland</td>
<td>170,000t</td>
<td>2018</td>
</tr>
</tbody>
</table>

Source: New Mines and Smelters 2013 and 2014 Reports, ILZSG
More Zinc will be Recovered from EAF Dust

- Befesa
- Horsehead Corporation *(new plant in North Carolina opened in May 2014)*
- ZincOx Resources
- Global Steel Dust
- Japan
World Lead Demand Forecast

ILZSG Forecast

• 2015 - Global -0.7%
  - China -0.6%
  - Ex China -0.7%

• 2016 - Global 2.6%
  - China 2.6%
  - Ex China 2.7%

Global Annual Change

Source: ILZSG
Demand from E-bike Sector May Have Peaked

E-bike production, China ‘000 units

Using lithium-ion
Using lead-acid

Source: NBS, CRU, BGRIMM
World Lead Mine Supply Forecast
(Glencore 9th October production cut not factored in)

ILZSG Forecast

• 2015
  - Global -2.5%
  - China -1.2%
  - Ex China -3.6%

• 2016
  - Global 1.2%
  - China 3.1%
  - Ex China -0.4%

Source: ILZSG
World Lead Metal Supply Forecast

ILZSG Forecast

• 2015
  - Global: -1.0%
    - China: -1.1%
    - Ex China: -0.9%

• 2016
  - Global: 3.5%
    - China: 3.2%
    - Ex China: 3.7%

Source: ILZSG
World Refined Lead Metal Balance

Source: ILZSG
Zinc Stocks and Prices

Source: ILZSG / LME
World Zinc Metal Demand Forecast

ILZSG Forecast

• **2015**
  - Global: 1.1%
    - China: 1.4%
    - Ex China: 0.8%

• **2016**
  - Global: 3.3%
    - China: 4.9%
    - Ex China: 2.0%

Source: ILZSG
Chinese Galvanized Sheet Production
1993 – 2015f

Source: NBS, Wood Mackenzie
World Zinc Mine Supply Forecast

(Glencore 9th October production cut not factored in)

ILZSG Forecast

- **2015**
  - Global: 0.3%
  - China: 1.9%
  - Ex China: -0.6%

- **2016**
  - Global: 1.8%
  - China: 7.8%
  - Ex China: -1.8%

Source: ILZSG
World Zinc Metal Supply Forecast

ILZSG Forecast

• 2015
  - Global  3.7%
    - China  6.8%
    - Ex China  1.3%

• 2016
  - Global  1.6%
    - China  3.2%
    - Ex China  0.3%

Source: ILZSG
Zinc Metal World Balance

Source: ILZSG
Next Study Group Meetings in Lisbon, Portugal

- ICSG: 9 - 10 March 2016
  in conjunction with Metal Bulletin International Copper Conference, Lisbon, Portugal

- INSG & ILZSG: 25 - 27 April 2016
  including a Joint INSG/ILZSG Seminar