Sea Changes in the Copper Industry: Evolution or Revolution?

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A global commodity

Imports Feed (2002)

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Rise of Refined Usage

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Getting connected with copper

Telephone subscribers per 100 inhabitants (2002)

- India: 5.2
- China: 32.8
- Indonesia: 9.2
- Asia: 24.4
- Portugal: 124.6
- World: 36.9

Source: ITU

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Chile: World’s Powerhouse

Changes in Copper Mine Production
1970 to 2003

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Refined Production

Refined Copper Production, Thousand Tonnes

- Chile
- China
- United States
- Japan
- Russian Fed.
- Germany
- Australia
- Peru
- Canada
- Poland
- Mexico
- Kazakhstan
- Belgium
- India
- Spain
- Zambia
- Peru
- Australia
- Germany
- Japan
- Russia
- United States
- China
- Mexico
- Kazakhstan
- Belgium
- India
- Spain
- Zambia

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A shift in dominance to Latin America and Asia

- Domination of Latin America
- Rise of Asia
- North American production stays steady
- Europe keeping up

<table>
<thead>
<tr>
<th>Year</th>
<th>Mine Prod</th>
<th>Refined Prod</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>3.9 M t</td>
<td>4.5 M t</td>
</tr>
<tr>
<td>2003p</td>
<td>13.6 M t</td>
<td>15.2 M t</td>
</tr>
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</table>
An Asian appetite for copper
Scrap: All roads leads to China

Scrap Imports 2002: 3.2 Mt

- China: 32%
- Germany: 13%
- Belgium: 8%
- Spanish: 6%
- Japanese: 4%
- Italian: 6%
- USA: 3%
- Taiwanese: 3%
- Other: 19%

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...Asia driving demand
### Projected Capacities to 2007

<table>
<thead>
<tr>
<th>000’s metric tonnes Cu</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
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<tbody>
<tr>
<td>Concentrates</td>
<td>12,534</td>
<td>12,856</td>
<td>13,346</td>
<td>13,413</td>
<td>13,603</td>
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<tr>
<td>SX-EW</td>
<td>3,053</td>
<td>3,050</td>
<td>3,337</td>
<td>3,414</td>
<td>3,650</td>
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<tr>
<td>Smelters</td>
<td>14,927</td>
<td>15,628</td>
<td>15,967</td>
<td>16,136</td>
<td>16,241</td>
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<tr>
<td>Electrolytic</td>
<td>14,820</td>
<td>15,504</td>
<td>15,889</td>
<td>16,145</td>
<td>16,165</td>
</tr>
<tr>
<td>Refineries</td>
<td>18,675</td>
<td>19,380</td>
<td>20,143</td>
<td>20,556</td>
<td>20,811</td>
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<tr>
<td>Year on Year Changes</td>
<td></td>
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<tr>
<td>SX-EW</td>
<td>321</td>
<td>490</td>
<td>68</td>
<td>190</td>
<td>1069</td>
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<tr>
<td>Smelters</td>
<td>-4</td>
<td>288</td>
<td>77</td>
<td>236</td>
<td>597</td>
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<tr>
<td>Electrolytic</td>
<td>701</td>
<td>339</td>
<td>169</td>
<td>105</td>
<td>1314</td>
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<tr>
<td>Refineries</td>
<td>684</td>
<td>385</td>
<td>256</td>
<td>20</td>
<td>1345</td>
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<td>Refineries Total</td>
<td>705</td>
<td>763</td>
<td>413</td>
<td>255</td>
<td>2136</td>
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</tbody>
</table>
Producer discipline reigns in supply
..tightness in concentrate markets to ease...if all plans materialize
Stocks decline and prices rise

The chart illustrates the decline in copper stocks over the period from January 2002 to February 2004, with a concurrent rise in prices. The graph shows the following:

- **LME Cu Stocks** represented in blue.
- **Comex Cu Stocks** represented in teal.
- **SHFE Cu Stocks** represented in yellow.
- **Cu Price LME (cents/lb)** represented in red.

The data indicates a steady decline in copper stocks from approximately 1,800 thousand metric tonnes in January 2002 to around 1,050 thousand metric tonnes in February 2004. Simultaneously, copper prices increased sharply, starting from around 0 US cents/pound in January 2002 and rising to 140 US cents/pound by February 2004.
Deficit, deficit, deficit

Usage

Refined Production

Balance

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Coping in a New Environment

Global Issues
- Sustainable Development
- Social/Corporate responsibility
- Climate Change
- Recycling

Governments
- PBT/PP vs RA/RM
- Waste Policies
- End of Life Directives
- Water quality
- Restriction on product uses
- Internationalization of regulations
- Economic Growth
- Social development

Industry
- Market dynamics
- Competition
- Technological changes
- Market opportunities & barriers
- Voluntary measures
- Regulations

“Civil Society”
- NGOs & Public
- Organized, vocal, credible
- Sustainable consumption
  - Factor 4, factor 10
- Focus on Extractive industries
Intensity of Use

GDP per capita (2003 USD) vs. Cu Refined Usage per capita (kg)

-10,000 - 10,000 20,000 30,000 40,000 50,000 60,000

-10.00 1.00 3.00 5.00 7.00 10.00

China  India  Japan  United States

1980  2003

-500.00 1,000.00 1,500.00 2,000.00 2,500.00

Refined Usage (kg) per GDP (USD million)

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Prospects for India

- Growing population (UN)
  - 2045: 1.5 billion
  - Urban shift: 28% (2000) to 41% (2035)

- Infrastructure
  - Electricity
    - Only 30% rural households with access
    - Power for all by 2012

- Rising net income to propel consumer demand
  - White goods, ACR, electronic based goods, automobiles,…
Copper: Essential, sustainable, recyclable, efficient

- 2002: Close to one third of the world’s population without access to electricity
- 2030: +2 billion people
- Rural → Urban: 1.1B
- GDP: 3% per year
- 2050: additional billion
  - Aging populations
  - South Asia, India: increase in productive population
- Significant infrastructure investments
  - Electricity (Additional capacity, renewable sources, energy efficiency)
  - Water

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Acknowledgments

• Technology Information, Forecasting and Assessment Council (Dept. of S&T, India)
• MECON India
• Ministry of Mines (India)
• Indian Copper Development Centre
• Confederation of Indian Industry

• Principle data sources
  – International Copper Study Group databases & publications (Copper Bulletin, Directory of Mines and Plants)
  – Exchanges (LME, COMEX, Shanghai)
  – United Nations
  – International Monetary Fund
  – OECD
  – Confederation of Indian Industry
  – Central Statistical Office of India
  – World Bank
  – International Energy Agency
  – International Telecommunications Union