JOINT STUDY GROUPS’ - INDIAN MINISTRY OF MINES

SEMINAR
“THE GROWING IMPORTANCE OF MINING AND METALS IN INDIA”

END USE PROSPECTS FOR COPPER - AN OVERVIEW

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AGENDA

• Brief History – usage growth in past 2 decades
• Important end use sectors / sector wise (%) usage
• Growth Prospect – key drivers
• High growth areas – identification
• Newer possibilities
• Preparedness of domestic industry
• Challenges
• Conclusion
TOTAL COPPER* USAGE TRENDS

* Primary + Secondary + Imported Semis
IMPORTANT END USE SECTORS

• Electrical
• Transport
• Process Industry
• General engineering
• Consumer durables
• Building & construction
KEY DRIVERS FOR GROWTH PROSPECTS

• Growing domestic market extending to rural areas
• Govt.'s priority for Infrastructure development
• Indispensability of copper for many end use sectors which are on fast growth track
• Increased quality consciousness
• Improved life style
• Newer opportunities
EXISTING MARKET - WITH HIGH GROWTH POTENTIAL

- Electrical
- Transport
- General Engineering
- Consumer Durables
ELECTRICAL

WHY

• Very low per capita electricity consumption

• Addition to generation capacity

• Thrust on improved Power Quality by better Transmission, Distribution & Utilization System

• Introduction of Energy Efficient ‘STAR’ rated consumer durables
TRANSPORT

**WHY**

**Railways**
- Increased plan for track electrification
- Higher capacity loco manufacture
- Underground / overhead services
- AC coaches
- Improved signaling system

**Automobile**
- Auto electrical
- Efficient electrical system
- Increased production facility
RAILWAY COPPER DEMAND GROWTH FOR OVERHEAD ELECTRIFICATION

Growth During the Period = 45%

Electrified Route KM
Copper Usage
AC & R MARKET

**WHY**

- Domestic demand for AC is increasing
- Energy efficient (VRF) AC is becoming popular
- Demand for commercial establishments will give maximum demand push
- 15-20% p.a. copper tube demand is possible (present estimated usage = 30,000 tpa)
RELATIVELY NEW MARKET

• Water & Gas pipe line in buildings
  - *Tubing, regulator, meter etc.*

• Solar water heater
  - *Tubing, collector plate etc.*
FUTURE POSSIBILITIES

• Copper motor rotor
• Agricultural sprinkler
• Desalination
• Anti-microbial property based applications
• Reverse substitution
## PROSPECTS IN NEWER MARKET

<table>
<thead>
<tr>
<th>Product</th>
<th>Material</th>
<th>Yearly Demand Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Meter</td>
<td>Brass</td>
<td>10-15%</td>
</tr>
<tr>
<td>Rotating Sprinkler for Agriculture</td>
<td>Brass / Gun Metal</td>
<td>20%</td>
</tr>
</tbody>
</table>
PREPAREDNESS OF SEMIS INDUSTRIES

Adoption of latest technologies

- Continuous strip casting line
- CCR wire rod mills
- High speed wire drawing machines
- Cluster rolling mills
- Continuous pickling lines
- Pilger mill
- Continuous annealing lines
- Conform
- Cast & Roll

and

Improved quality assurance through

- Updated testing facilities
- ISO accreditation
THE CHALLENGES

• Inadequate domestic resources for copper mineral

• Relatively smaller individual capacity of semis manufacturers

• Lack of secondary refined copper manufacturing facility

• Substitution threat due to high & fluctuations in copper price
HOW TO OVERCOME THE CHALLENGES

- Ensuring raw material (Copper ore) security
- Increased scale of operation of individual semis manufacturers
- Economizing production cost - yield improvement
- Setting up efficient recycling facility
- Awareness creation on LIFE CYCLE COST rather than FIRST COST
Substitution efforts will continue.

Demand growth in established end use sectors, and newer opportunities will off-set the loss due to substitution.

On average 7-8% p.a. demand growth rate appears to be achievable under the present situation.

By 2020, India is likely to be the 3rd largest copper market and 2nd largest market by 2025.
Thank You
<table>
<thead>
<tr>
<th>Country</th>
<th>Consumption</th>
</tr>
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<tbody>
<tr>
<td>Canada</td>
<td>17,053</td>
</tr>
<tr>
<td>US</td>
<td>13,647</td>
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<tr>
<td>Australia</td>
<td>11,174</td>
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<td>Japan</td>
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<tr>
<td>Italy</td>
<td>5,656</td>
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<tr>
<td>China</td>
<td>2,471</td>
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<tr>
<td>India</td>
<td>779</td>
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<tr>
<td><strong>World Average</strong></td>
<td><strong>2,782</strong></td>
</tr>
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</table>
Expected CAGR > 15%

• Air Conditioning System
  – Growth during last 5 years: over 20%
  – Present Penetration level is only: 3%
  – Expected medium term growth: 15-20%

• Commercial Refrigeration Sector
  – Growth during last 5 years: ≈ 10%
  – Expected medium term growth = 10-12%
RAILWAY OHE PROGRAMME

• 11th 5 Year Plan –
  4500 route km electrified
  (18,900 tonne Cu)

• 12th 5 Year Plan –
  6500 route km electrification
  (27,300 tonne Cu)