The Copper Report Navigating through the Demand and Supply Gap

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Centre for Social and Economic Progress | CSEP
Independence | Integrity | Impact

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Objectives and Backdrop

- **Objectives and Backdrop**
- Demand Projections
- Supply-side Scenario
  - Global
  - Domestic Copper Scenario
- Trade Barriers
- Policy Recommendations

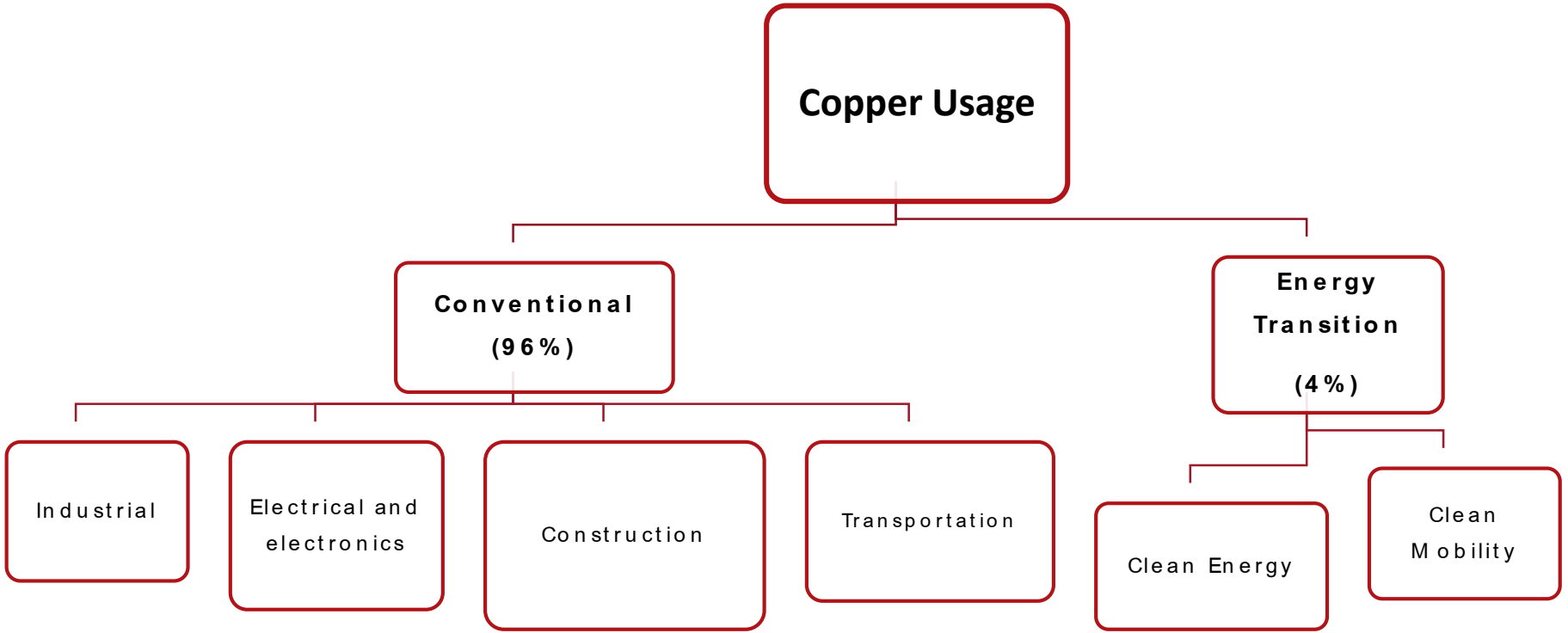
Objectives

- Positioning the Indian copper supply chain in the context of the global landscape
- Estimating sectoral demand of copper till 2030
- Analysing challenges and opportunities for India's copper sector from exploration to end-use
- Policy recommendations to develop a resilient and sustainable copper strategy for India

Backdrop

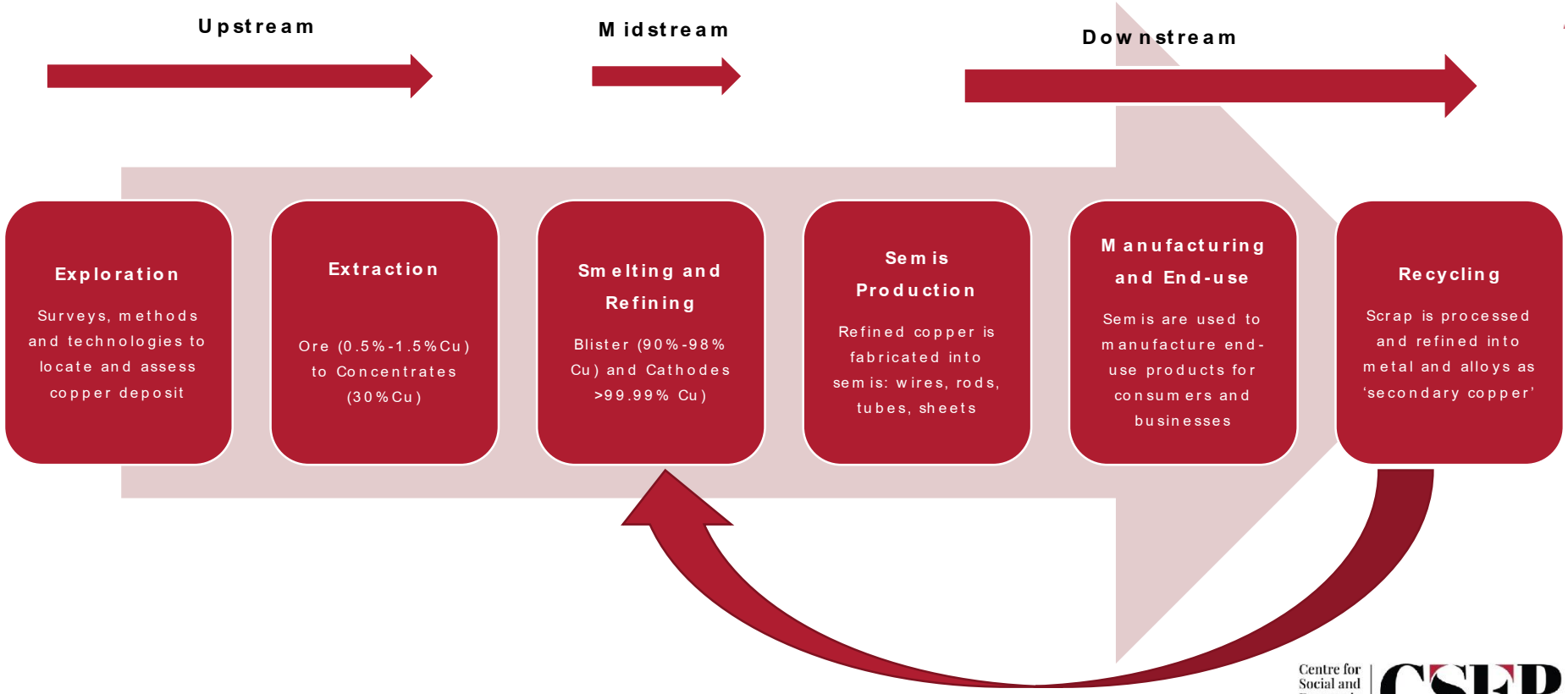
- Copper is a cross-cutting critical mineral used in traditional and green energy transition sectors
- The use of copper is an important leading indicator of a nation's economic health (Dr Copper)
- Demand for copper is accelerating globally, with prices at high levels
- Countries are diversifying their copper supply chains
- Despite huge reserves and resources, India is 95% import-reliant

Copper: A Cross-Cutting Metal



Source: Authors' compilation from multiple secondary sources

Simplified Representation of Copper Value Chain



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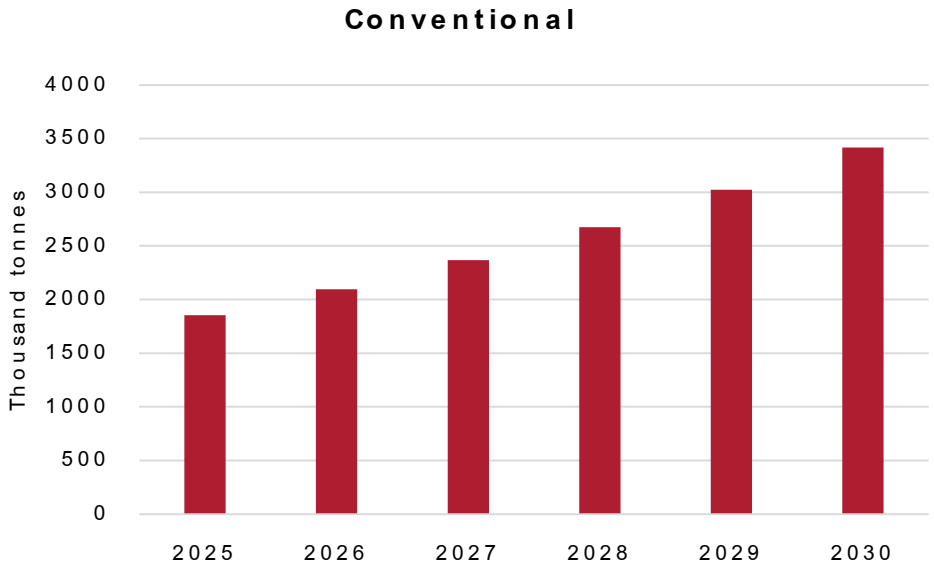
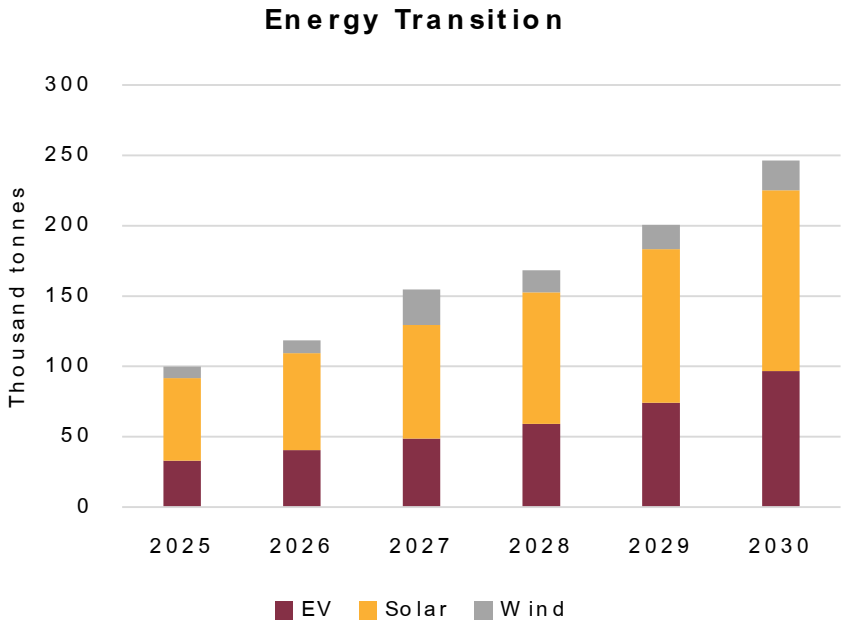
Projected Sectoral Copper Demand





Source: Authors' analysis based on NITI-Aayog India Energy Security Scenario (IESS Determined Scenario)

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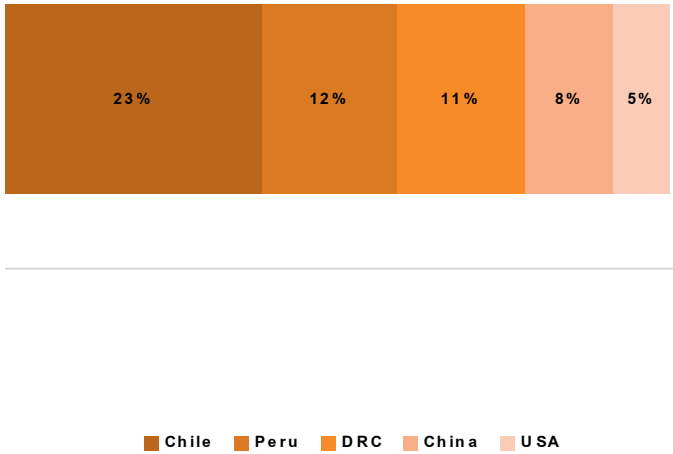
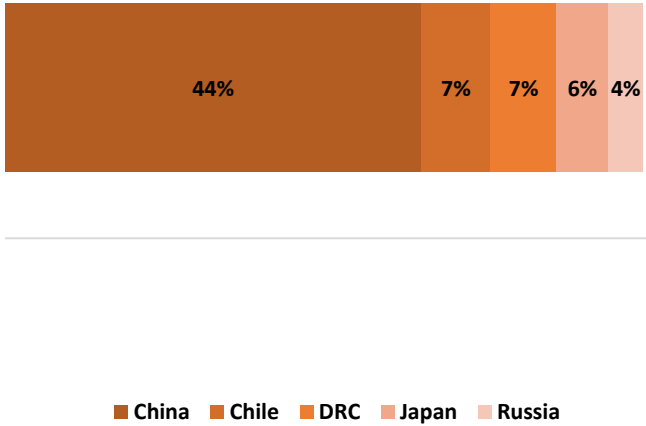
Global Copper Scenario

GLOBAL COPPER EXTRACTION



GLOBAL COPPER PROCESSING



Source: USGS, 2024

Global Copper Landscape: Challenges

Upstream	Midstream
Globally average copper ore grade has declined by 25%, over the last decade, escalating operational cost	Plummeting TC/RCs on account of tightened supply of concentrates and expansion of smelting and refining capacity reducing processors' margin
Less focus on greenfield exploration, delay in commissioning new mines and limited discoveries	Highly concentrated, China accounts for about 50% of the global copper processing capacity
Increasing export restrictions, trade wars, geopolitical turmoil, and inefficient mining policy	Non-addressal of environmental and social concerns can jeopardise social license to operate, ultimately leading to closure of operations

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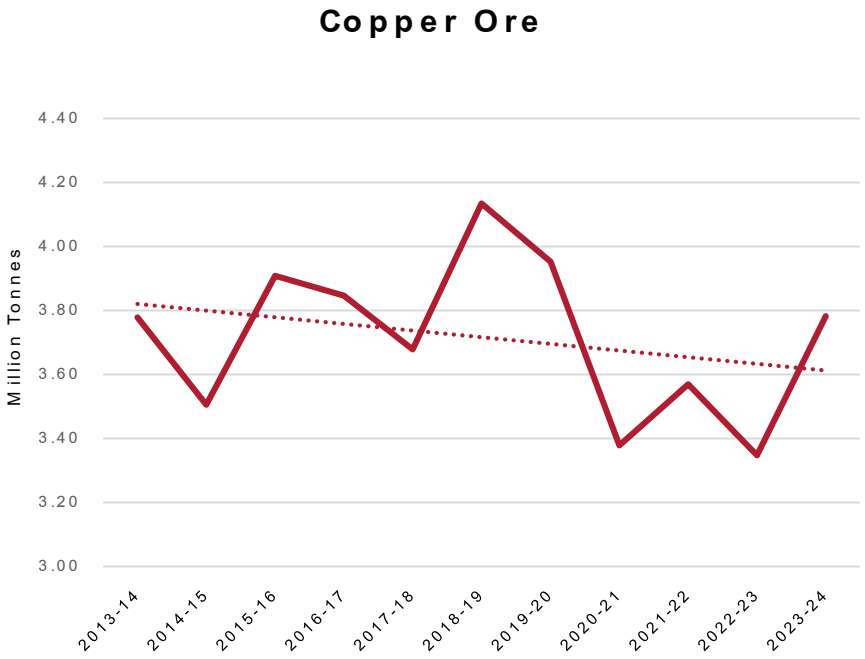
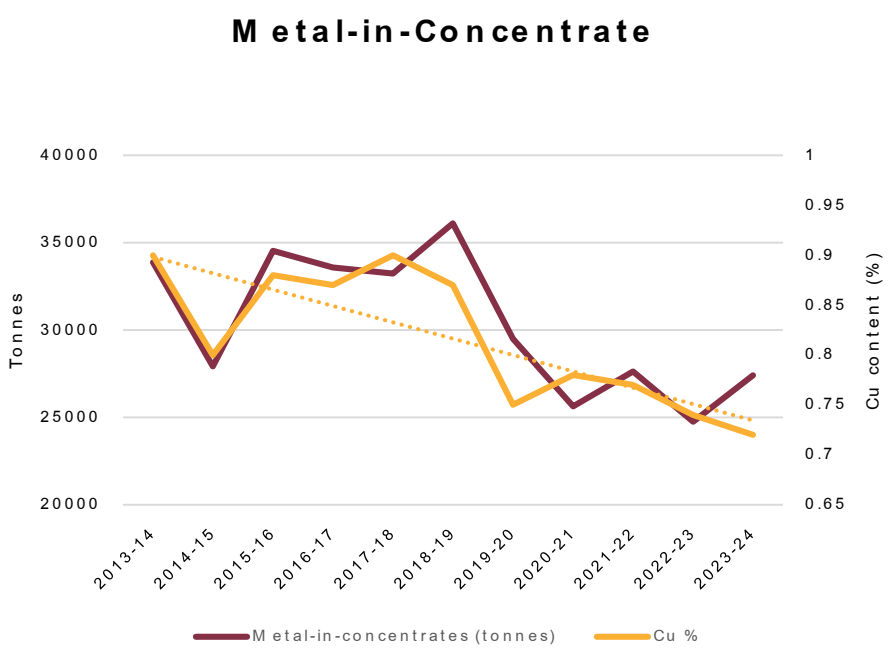
Upstream





Only HCL (public sector) owns and operates five copper mines in India with latest ore production of 3.78 M TPA

Source: Indian Mineral Yearbooks, IBM , HCL

Upstream Challenges: India

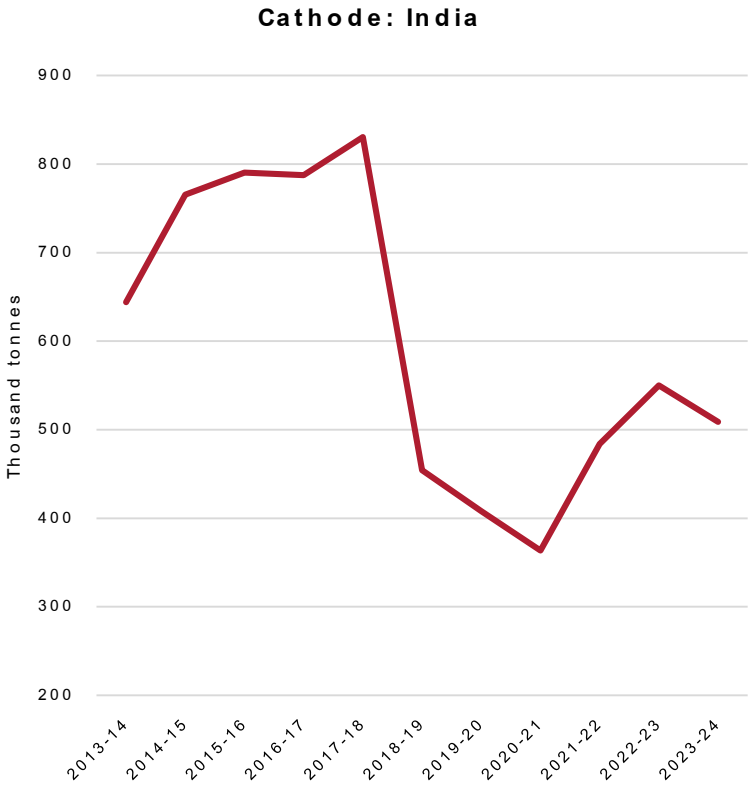
Exploration

- 8 Mt resources with high Cu grade (>= 1.85%) remain untapped
- Only 4% of the exploration budget from NMET is allocated to copper exploration
- Limited private sector participation
- Exploration Licenses 2023: An EL does not provide requisite incentives without the right to a mineral concession

Extraction

- In 2010, HCL declared to boost ore production to 12 MTPA from 3.6 MTPA by FY2017, but the current output is 3.8 MTPA
- Metal content from ore is low and declining
- HCL's mines are nearing exhaustion, with expansion plans being unsuccessful
- Five auctioned copper blocks remain non-operational due to their commercial non-viability
- Pendency/Delay on statutory approvals

Midstream



Companies	Installed Capacity (thousand tonnes)	Type	Present Status
HCL	68.5	PSU (integrated producer)	Since 2020, HCL has phased out cathode production, direct sale of concentrates in market and to Hindalco through a PPP
Hindalco	500	Private (Port-based Custom Smelter)	Meets >50% of domestic refined copper requirements
Sterlite Copper (Vedanta)	460	Private (Port-based Custom Smelter)	Tuticorin smelter (400 kt) is not operational since 2018
Kutch Copper Ltd. (in-progress)	500	Private (Port-based Custom Smelter)	First unit of Phase 1 was commissioned in March, 2024

Source: IBM , Ministry of Mines

Mid-stream Processing Challenges: India

- The Tuticorin copper plant (Sterlite Copper) with 400 KTPA, contributing 36% of domestic demand for refined copper, has been closed since FY 2018 due to environmental non-compliance
- High import reliance on procuring cathodes
- High capex required for processing
- Environmental externalities, leading to community unrests
- In the bilateral negotiations, technology transfer does not get enough attention

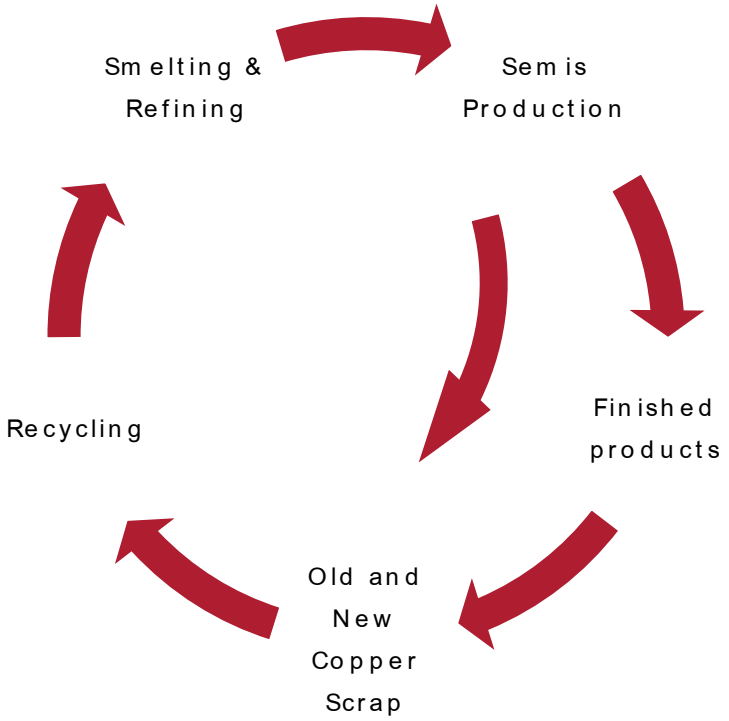
Downstream: Fabrication and End-use

- Lack of incentives and high CAPEX required
- PLI benefits should be given in the short term with a sunset clause
- Lack of innovation, R&D
- Technology transfer, heavily patented products
- Inadequate domestic value addition, influx of cheaper imports
- QCO on copper cathodes further complicates the easy availability of cathodes

Competitive Price Pattern of Copper

- Copper price has remained high in recent years, whereas the prices of nickel and cobalt have plummeted sharply since Q1-2022 and lithium since Q3-2022
- The steady high prices of copper may be due to rising copper demand while other minerals seem to be in over supply
- Copper investments seem to have a robust future scope
- Copper has mature markets with sizeable volumes of secondary supply

Recycling: Circular Economy



- Secondary copper exhibits equivalent physical and performance properties as primary copper, with 85% less energy-intensive process
- End of Life-Recycling Rate>50% (UNEP)
- Urban Mines (having embedded copper): significant secondary reserve- *Mine the Gap*
- Globally, 32% of copper usage comes from recycling
- The intrinsic value of embedded copper in global e-waste is appx. 19 billion USD

Recycling Challenges

- Fragmented and informal recycling sector, health hazards
- Only 33% of e-waste has been successfully collected and processed in India (2022)
- India has a high copper recycling rate; however, the recycling does not go through a proper refinement process to produce high-quality copper
- Lack of secondary processors in the current recycling infrastructure
- India lacks quality standards for scrap, leading to imports of low-copper-content scrap materials
- Products with embedded copper take a longer time to attain 'end-of-life', affecting the availability for recycling

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Import Reliance and Trade Barriers

- India currently imports 95% of ore & concentrates, the demand is likely to increase with Kutch Copper's entry
- India became a net importer of cathode since FY 2019, with the closure of the Tuticorin copper plant in 2018
- Higher influx of imported 'semis' in India under India's trade agreements with UAE, Japan, South Korea and ASEAN
- Circumvention of rules of origins
- Increasing import of subsidised copper tubes and pipes from ASEAN countries

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Policy Recommendations

Upstream

- Channelising more NMET fund towards private exploration with assured mining rights.
- Streamline mineral concession processes through one-stop clearance to avoid time-cost
- Evaluate HCL's performance to boost domestic copper extraction

Midstream

- Strategic collaboration among miners, processors and fabricators
- Diversifying revenues by capitalising high-value intermediate products
- Focus on R&D, technology innovation
- Strengthening environmental standards and adopting globally recognised third-party verification

Downstream

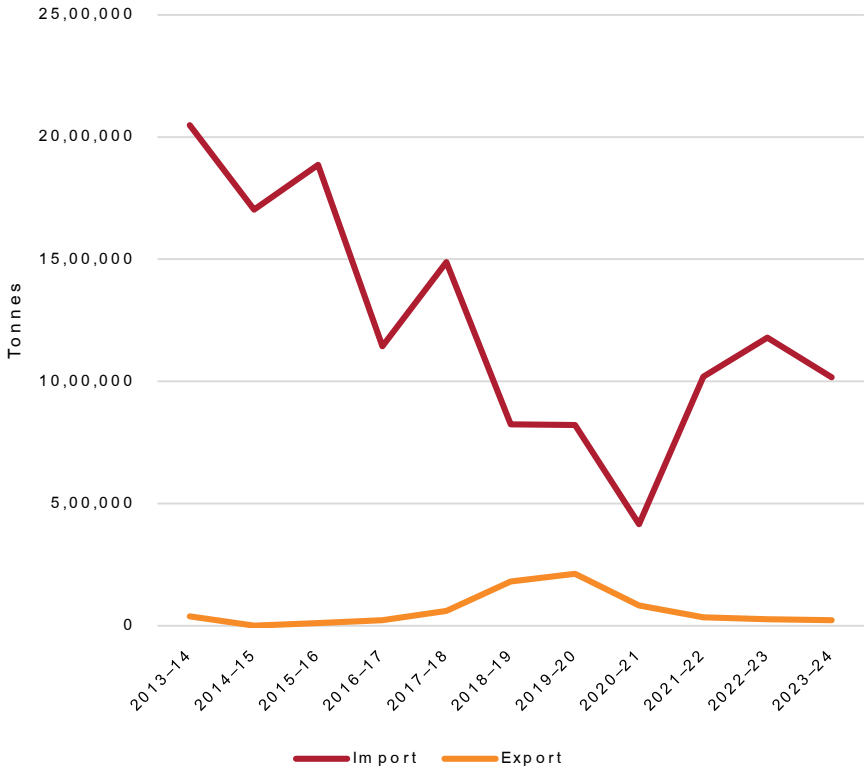
- Utilise Kutch Copper's entry to boost domestic cathode production
- Review of trade agreements and duty structures
- Expand PLI to resource efficiency and environmental standard beyond mere production target
- Formalising secondary copper market
- Strategic international partnerships in resource diplomacy to secure copper supply chain

Thank You!

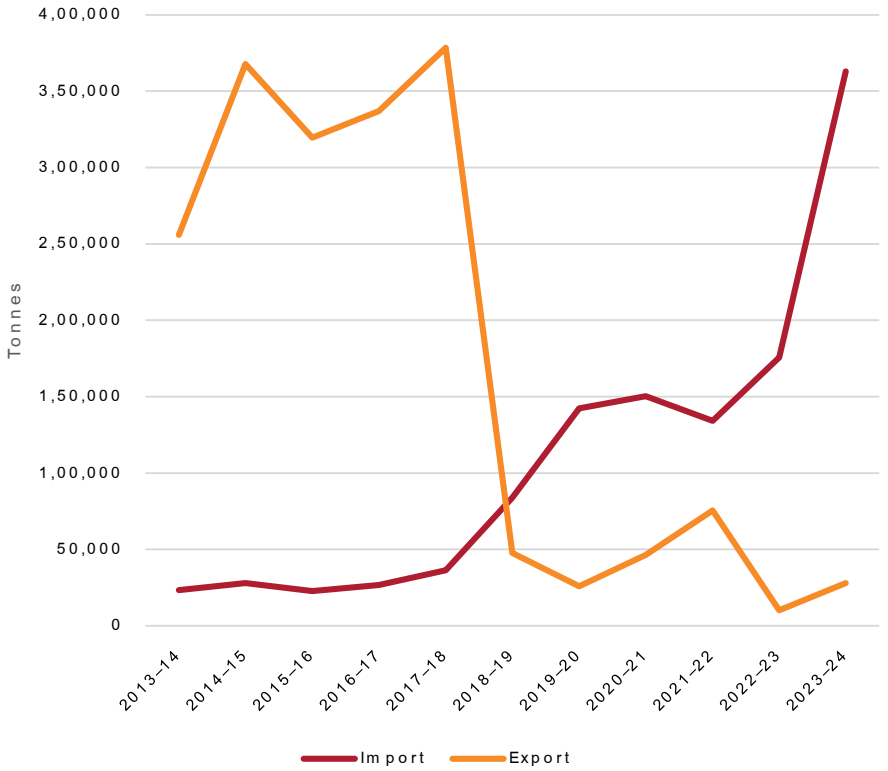
For further research enquiry please contact tpal@csep.org

CSEP Minerals & Mining team | Mining Matters

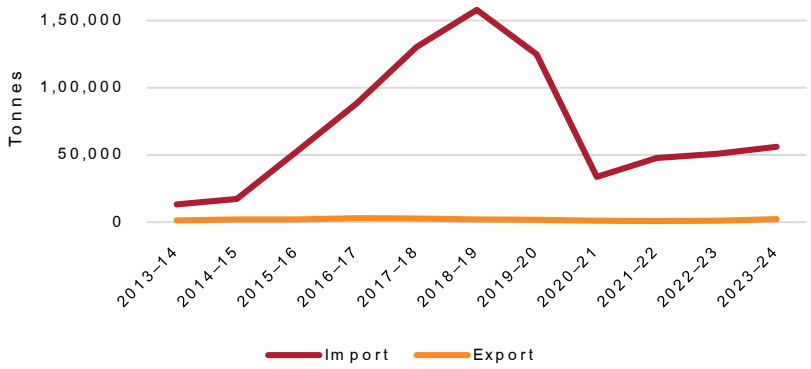
Ores and Concentrates



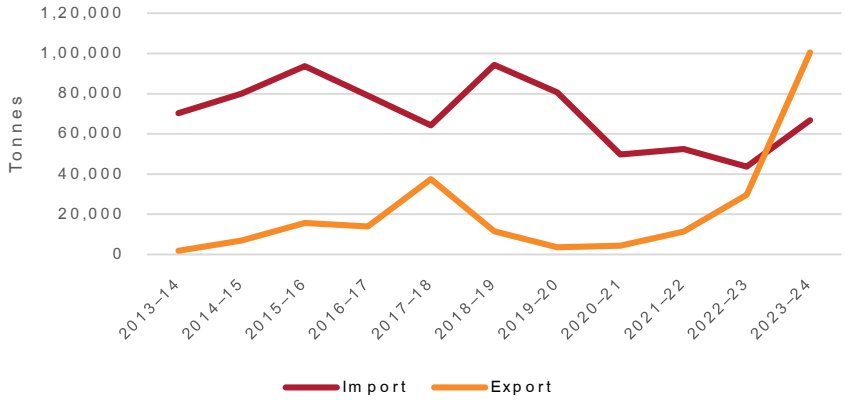
Cathodes



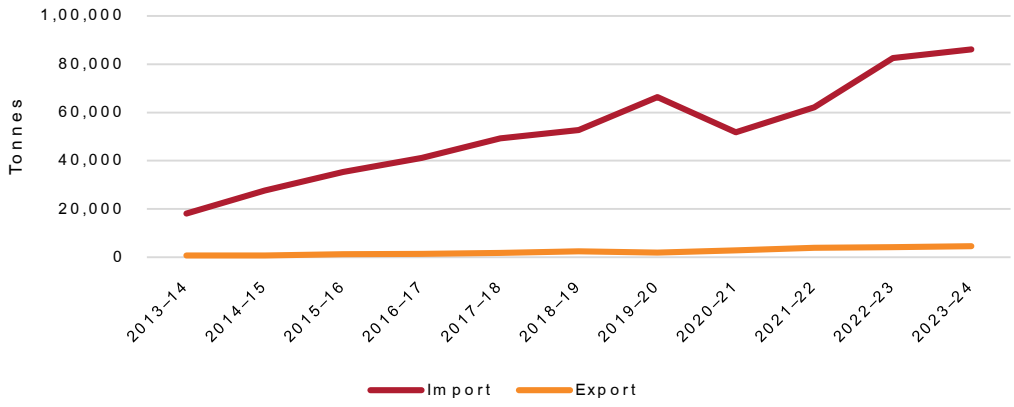
Copper Wire



Copper Rod



Copper Tube



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