

Securing India's Copper Future Through Recycling

Building India's Secondary Copper Ecosystem

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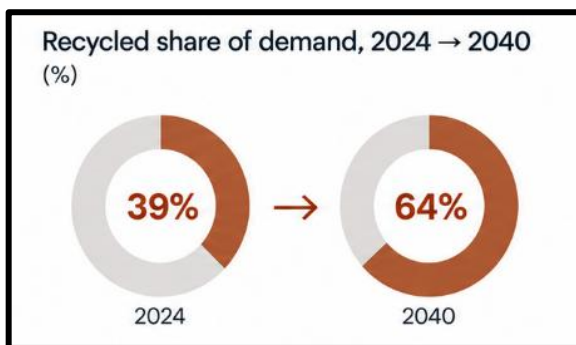
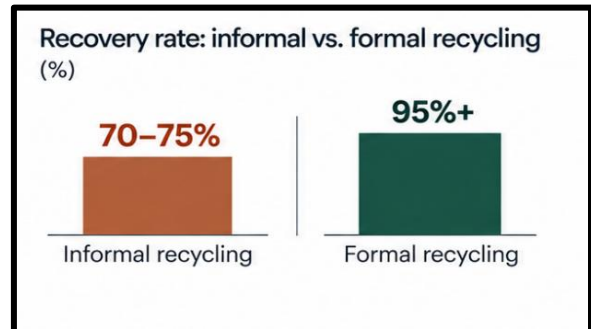
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1. Executive Summary

India's energy transition is accelerating, with nearly 289 GW of renewable energy capacity and a target of 500 GW of non-fossil capacity by 2030. Copper is critical to this transition, with India's copper demand projected to reach 7.6 Mn MTPA by 2040.

Meeting this demand through primary production alone will be challenging. India is projected to face a copper supply deficit of approximately 0.38 Mn MTPA by 2030 and only further projected to increase, increasing its reliance on imports further. Globally, declining ore grades, a 70% fall in mine discoveries since the 1990s and 17–25 year mine development timelines are further constraining supply.

Recycling can help bridge this gap. Recycled copper already meets nearly 39% of India's demand, but around 75% of the recycling ecosystem remains informal, where recovery rates are lower than that of formal recycling consisting of modern facilities.



With secondary copper projected to reach 4.87 Mn MTPA by 2040, accounting for 64% of India's copper demand, the opportunity is to formalise and scale the recycling ecosystem strengthening domestic supply, reducing import dependence and lowering the carbon intensity of India's energy transition.

Capital and policy are moving together. Hindalco, Gravita, Jain Resource Recycling and others have committed over INR 2,400 Cr to new recycling and refining capacity, while the National Critical Mineral Mission, EPR-linked recycled content mandates and Tamil Nadu's Circular Economy Investment Policy are steadily de-risking the economics of formal recycling.

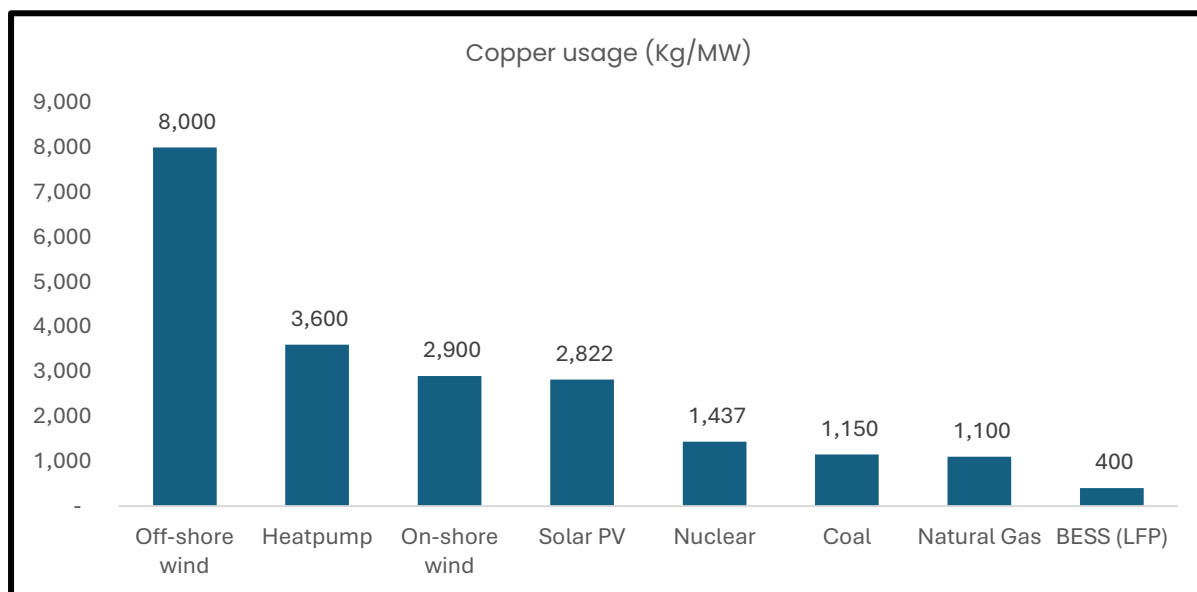
These investments are not without risk. Feedstock availability remains the key operational risk, alongside copper price volatility and informal sector competition. These risks can be managed through stronger sourcing networks, efficient working capital management and compliance led differentiation.

2. Copper Market Dynamics

a. Global Copper dynamics

The global energy transition is driving an unprecedented increase in copper demand, with consumption projected at 42 Mn MTPA by 2040.

This demand is driven by Electric vehicles (53Kg vs 23Kg for ICE), AI Data centres (32 Tons vs 20 Tons for 1MW data centres), & Transmission line enhancement to handle the increase in end usage of power. Copper usage for renewable energy sources is given below:



Source: IEA, S&P Global, JRC & TNIFMC

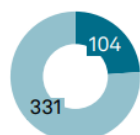
Meeting this surge in demand will be increasingly challenging as global copper supply faces mounting structural constraints. Nearly 50% of mine production is concentrated in Chile, the Democratic Republic of Congo (DRC), and Peru, while declining ore grades from 1–2% historically to below 0.7% are raising extraction costs and limiting future supply.

Expanding to a new greenfield copper mine typically takes 17–25 years, while discovery of deposits has fallen by nearly 70% since the 1990s. These mines cannot support us for a long time, as copper would be available only for about 40–45 years with the current rate of primary copper extraction.

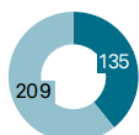
Figure 48. Copper reserves & resources (2025)

MMt Cu

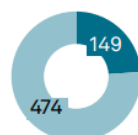
USA and Canada
18 years of R&R¹



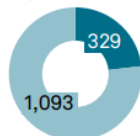
Europe and Russia
14 years of R&R



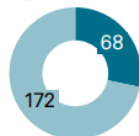
APAC
26 years of R&R



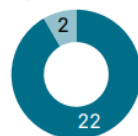
Latin America
60 years of R&R



Africa
10 years of R&R



Middle East
1 year of R&R



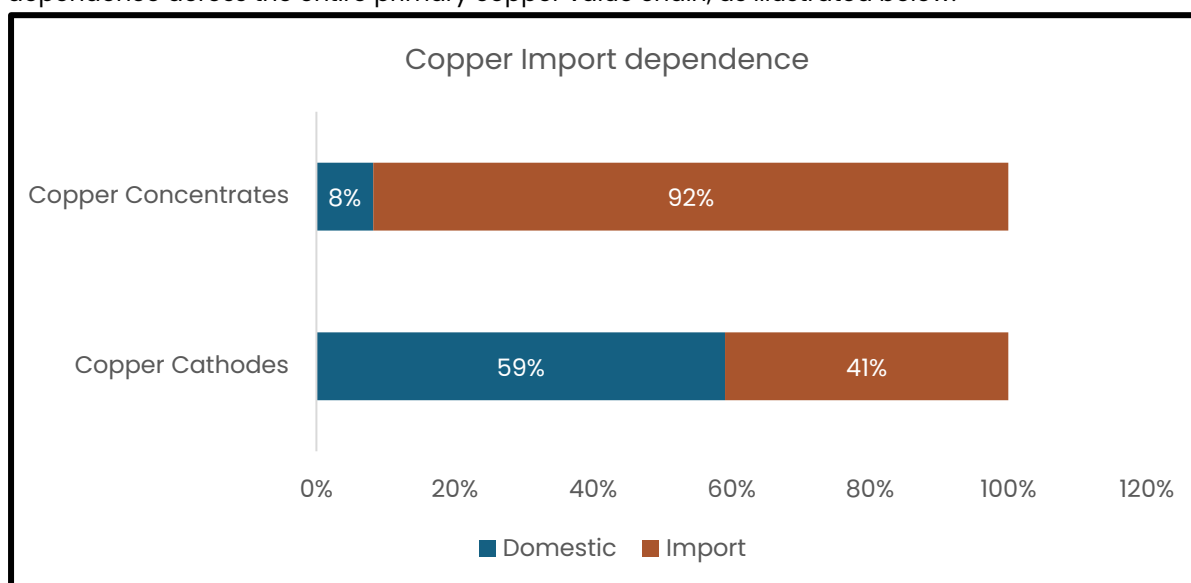
■ Reserves
■ Resources

Source: S&P Global

These structural constraints are now being compounded by operational disruptions. Indonesia's Grasberg Block Cave mine was shut under force majeure through early 2026, the Kamo-a-Kakula mine in the DRC faced earthquake induced flooding, Anglo American lowered its 2026 production guidance by up to 80,000 tonnes, and Chilean copper output declined for five consecutive months through end 2025.

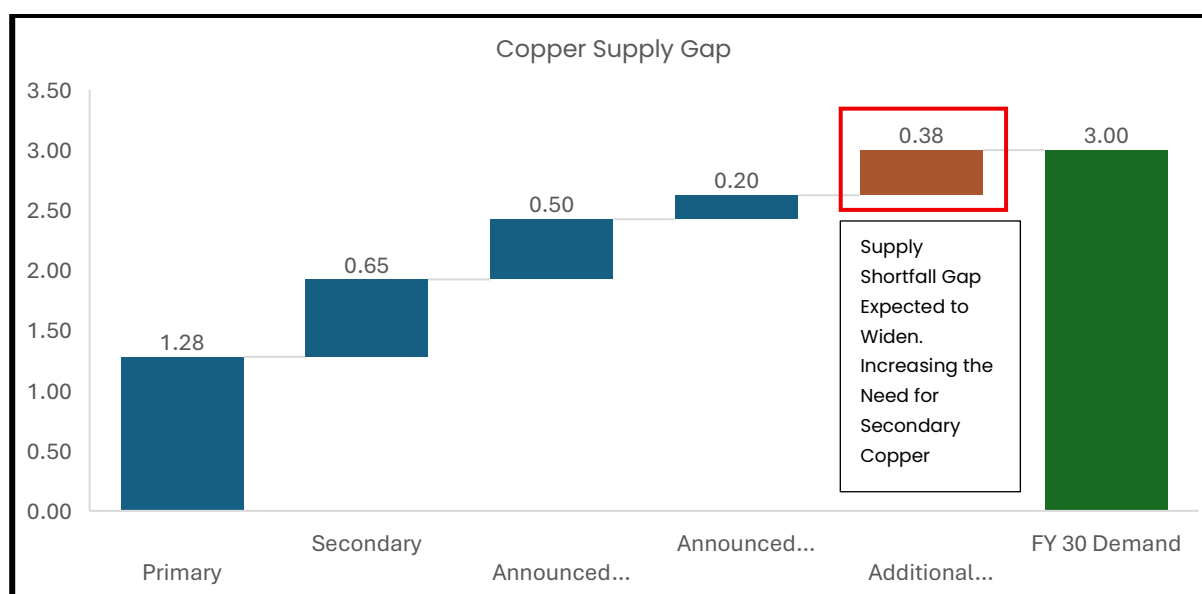
b. Indian Structural Copper deficit

These global constraints are increasingly shaping India's copper market, where over 90% of copper requirements are import dependent across the value chain. Since copper cathodes are produced from copper concentrates, India's heavy reliance on imported concentrates effectively translates into dependence across the entire primary copper value chain, as illustrated below.



Source: ICA

India is particularly vulnerable to these global dynamics. Domestic copper demand currently stands at approximately 2 Mn MTPA and is projected to increase to 3 Mn MTPA by 2030 and further to 7.6 Mn MTPA in 2040, this would further amplify the import dependence for India.



Source: Copper Vision Document 2025, ICA, TNIFMC

Adding to the existing global supply constraints, the closure of Sterlite Copper's Tuticorin smelter in 2018 eliminated nearly 40% of India's smelting capacity, widening the country's supply deficit and dependent on imported copper concentrates and cathodes, with copper imports reaching USD 10.7 billion in FY25.

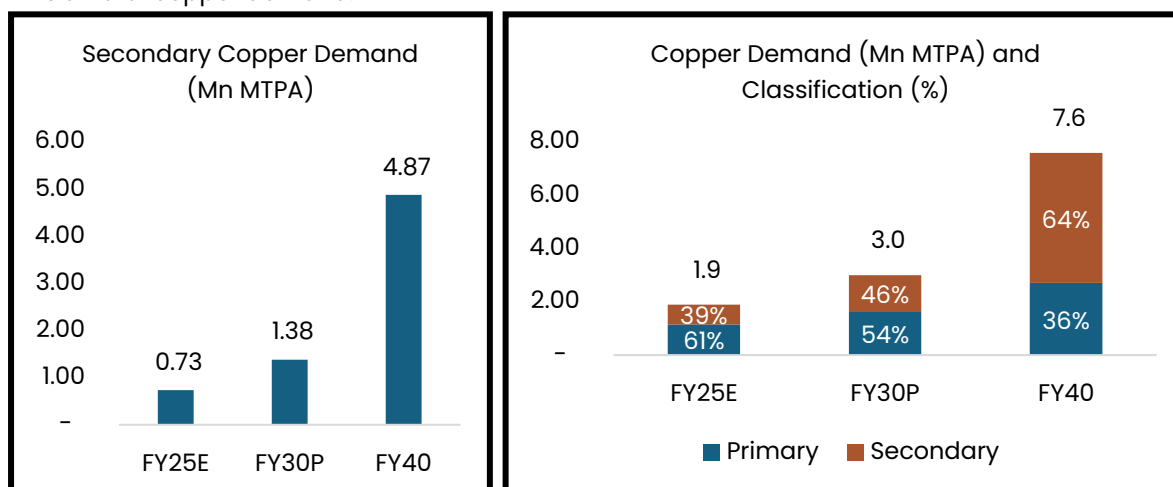
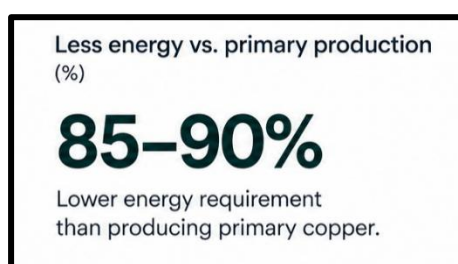
Although Adani Copper's Kutch project will add 1 Mn MTPA of primary copper capacity by 2028, limited domestic mining with Hindustan Copper as the sole producer means India will remain heavily reliant on imported copper concentrates.

As India strives for greater self-reliance in copper, recycling is emerging as a strategic source of domestic supply. It can supplement primary production, reduce import dependence, and strengthen the resilience of the country's copper value chain.

c. Recycling underpinning this supply constraint

Copper recycling has emerged as a strategic source of future copper supply. Copper can be recycled without any loss in quality while consuming less energy, reducing emissions from 4.1 tCO₂/t Cu to 0.62 tCO₂/t Cu.

Globally, recycled copper accounts for around 32% of supply, with its share expected to increase as primary production struggles to meet growing demand. In India, recycled copper meets nearly 39% of domestic consumption and is projected to reach 4.87 Mn MTPA by 2040 (CAGR 13.45%), contributing 64% of total copper demand.



Source: Niti Aayog, TNIFMC

Despite its advantages, scaling copper recycling remains challenging. Limited availability of quality scrap has made India dependent on imports for nearly 50% of its scrap requirement, while the predominance of unorganised recyclers (~75%) leads to lower recovery yields and inconsistent quality. (manual wire stripping, open cable burning, and basic induction furnaces with limited environmental controls).

Beyond the supply and climate case, organised recycling also offers attractive unit economics. Profitability depends on scrap procurement, recovery rates, processing efficiency and product realisation. Jain Resource Recycling reported copper EBITDA of ~INR 51,000/tonne in FY25, with normalised industry EBITDA expected at ~INR 30,000–32,000/tonne as the market scales. This highlights the commercial viability of formal recycling as the sector scales.

3. Investment Momentum & Policy tailwinds

India's copper recycling industry is entering a formalisation phase, with increasing capital flowing into organised recycling and downstream processing. Recent investments by large industrial players and specialised recyclers indicate growing confidence in the potential of secondary copper.

Recent investments reflect this shift towards scale and value addition:

Company	Project	Investment	Capacity	Status
Hindalco	Copper scrap & e-waste recycling, Gujarat	INR 2,000 Cr	50 KTPA initially, scalable to 200 KTPA	Expected commissioning FY27
Gravita India	Copper recycling plant, Mandvi, Gujarat	INR 160 Cr	29,400 MTPA	Operations expected within 12 months
Jain Resource Recycling	Copper cathode, wire rod & busbar forward integration	INR 95 Cr Phase I	9,000 MTPA	Expected commissioning Q1 FY27
Sunlite Recycling	Copper capacity expansion	INR 37 Cr	Capacity to 45,000 MTPA	Expansion targeted by Q1 FY28
Sree Sumangala	Copper cathode & allied products	INR 150 Cr	8,400 MTPA	Copper cathode production launched in 2025

Source: Earning calls of respective companies, TNIFMC

The emerging investment pipeline highlights a shift from standalone scrap processing towards an integrated secondary copper value chain, with players increasingly combining recycling with refining and downstream products.

The recent investment momentum is being reinforced by strong policy tailwinds, as India has introduced a series of measures since 2024 to formalise the recycling ecosystem and encourage organised capacity creation. Key policies are mentioned below

- [National Critical Mineral Mission \(Jan 2025\)](#): INR 1,500 Cr recycling incentive scheme, up to 20% capex support, targeting 270 KTPA of new capacity and INR 8,000 Cr of private investment.
- [Hazardous Wastes Amendment Rules 2024](#): EPR + recycled content mandate for copper rising from 5% (FY29) to 20% (FY32), creating guaranteed demand for secondary copper.
- [Tamil Nadu Circular Economy Investment Policy 2026](#): 10% capital subsidy (capped at INR 3 Cr) for eligible recycling projects.
- Additionally, India's NDCs (50% non-fossil capacity by 2030, net-zero by 2070) and NITI Aayog's push for Mineral Processing Parks reinforce long term secondary copper demand.

4. Risks and key pillars to scale copper recycling

The matrix maps the key sector risks by likelihood and potential impact, highlighting the areas that companies need to monitor and proactively manage.



Source: TNIFMC Analysis

These investments are not without risks. Companies remain exposed to scrap availability and quality, informal sector competition, copper price volatility, regulatory compliance and technology ramp-up.

What separates resilient recyclers?

It can be show through 4 key pillars:

Formalise Collection Build organised aggregation networks linking OEMs, dismantlers and e-waste processors to recyclers.	Upgrade Technology Move from manual stripping and open burning to modern sorting, smelting and refining.
Working-capital discipline Fast inventory turnover and disciplined exposure to copper-price movements can help company maintain margins and avoid cashflow crunch.	Enforce Traceability Use EPR and GST-based tracking so recycled-content mandates translate into real demand.

5. Conclusion:

The copper is already there. The demand is already there.

What remains is the infrastructure to bring them together and the capital to build it. Formalising India's secondary copper ecosystem can strengthen resource security, cut import dependence, and lower the carbon intensity of the energy transition, turning an informal waste stream into a strategic domestic resource.

The industry is moving towards an integrated formal value chain for recycling as illustrated below:



Source: TNIFMC (Infographic from AI)

Taken together, these developments place India's copper recycling sector at an inflection point. Rising demand, supply constraints and supportive policy are creating a strong case for a more organised secondary copper ecosystem. The ability to secure quality scrap, improve recovery efficiency and build formal, traceable value chains will determine how effectively the industry can scale and contribute to India's long term copper security.