

COMMODITIES · METALS · GRID INFRASTRUCTURE

We are Entering the Age *of Electricity*

Copper, Aluminum and Silver at the Centre of
the Next Growth Cycle

AUTHOR

Abhay Laijawala

Managing Director, Chief Investment Officer — India

LIGHTHOUSE-CANTON.COM

We are entering what the International Energy Agency (IEA) now calls the Age of Electricity — a multiyear era of intensive electricity growth, where the pace of the global economy will be set by how many kilowatt-hours it can generate, move and use.

The IEA projects global power demand to climb from 28,200 Terrawatt hours (TWh) in 2025 to 39,500 TWh by 2035 — a growth of 40% in ten years. This is a staggering figure. Let us look at the context and scale of what this 11,300 TWh means. This means that the world is on track to add the entire annual power consumption of the United States, China, and Japan combined onto the global grid in just ten years. Put another way, this means that the world is on track to add the entire annual power consumption of the European Union, multiplied by nearly four times over, onto the global grid in just ten years. It is important to understand the staggering scale of what is happening. This is not an incremental increase; it is the rapid coming of a second industrial civilization, creating an unprecedented, structural squeeze on the finite assets it rests on.

What we would like to emphasize today is that the more significant structural bottleneck of the age of electricity is not power generation. New solar, wind, and gas capacity is being added at record pace. The bottleneck is the physical grid itself: the transmission lines, transformers, and substations needed to deliver that power, which is what we spoke about in last week's issue of the Beam titled "Two super cycles running on one wire." Two metals sit directly inside that bottleneck, and a third rides right alongside it: aluminum and copper are the conductors in virtually every mile of new transmission and distribution line the world now has to build, while silver is not part of the grid itself but rides the same wave through the switchgear contacts and connectors inside grid equipment and through the solar capacity that has to be built out to help feed this demand.

Aluminum, copper, and silver are consequently set up for explosive, multi-year demand growth — not a cyclical bump, but a sustained structural demand boost driven directly by the sheer physical scale of grid infrastructure the world now must build.

COPPER, ALUMINUM AND SILVER — FROM CYCLES TO SECULARITY

Let us view this age of electricity through an investment lens. We are looking at a structural paradigm shift in both, commodities and commodity equities of specific metals that are at the center focus of the age of electricity, not a short-term cyclical trade. Managing these as legacy cyclical trades, exposed to short-term macro noise, as we have been treating them so far, would be wrong. Given the acute structural deficits building across the global power supply chain, selected resource and resource equities are transitioning from cyclical trades into long-term strategic compounds.

Copper is best placed, given its exposure to almost every driver of this growth. Silver and rare earths carry the sharpest near-term risk and the most geopolitical noise. Aluminum offers a steadier, more moderate way to play the same trend. As copper prices rise, aluminum also has the potential to emerge as a favored substitute but this potential is not yet baked into expectations.

ELECTRIFICATION DEMAND DRIVER MATRIX

High / Medium / Low reflects each metal's relative exposure to that demand channel, not absolute volumes.

Metal	Grid / Transmission	EVs	Solar PV	Data Centres
Aluminum	High Primary conductor material, 11 kg/MW/km AC	Medium Lightweighting, 150–250 kg/EV	Low Racking & mounting structures	Low Minor — enclosures/racking only
Copper	High Cabling & wiring backbone	High Wiring, motors, batteries	Medium Cell metallisation/wiring; demand +24% by 2035	High Power distribution & cooling
Silver	Low Minor — switchgear contacts	Medium Electrical contacts, electronics	High Cell paste/metallisation, 170M+ oz demand	Medium Contacts, connectors, electronics

Read: copper is the only metal with High exposure across three of four channels — the broadest-based beneficiary of electrification. Aluminum's exposure concentrates in grid buildout; silver's concentrates in solar.

PREPARE FOR A LOOMING COPPER SQUEEZE

Copper sits squarely at the center of the age of electricity, with aluminum playing a supporting role behind it. Copper is the one metal every part of this story needs. It sits in the wiring of every data center, every mile of new transmission line, every EV and every air conditioner. EVs are actually a big copper story: a single EV uses about 53kg of copper, more than double a car with an internal combustion engine, and the EV sector alone could need 2.5–4.3 million tonnes of copper a year by the early 2030s. Put in context, EVs use only around 0.9 million tonnes of copper today — so that is close to triple today's level by 2030, and up to roughly five times today's level by 2035. That dwarfs the 250,000–550,000 tonnes AI data centers are expected to use. Actual global copper demand was about 28.2 million tonnes in 2025, up from 27.3 million tonnes the year before. Wood Mackenzie sees demand reaching 42.7 million tonnes by 2035, and S&P Global projects 42 million tonnes by 2040 — a rise of roughly 50% from today's level within 15 years.

Copper is not the only metal in demand. Aluminum carries power over long distances, with demand growing 3–5% a year through 2035. Aluminum is emerging as one of the quieter beneficiaries of the electrification wave, mainly through its role in power grids and lightweighting. It's the preferred conductor material for most new overhead transmission and distribution lines because it's roughly a third the weight of copper for a given current-carrying capacity and considerably cheaper, so as countries build out grids to absorb more renewables, EVs, data centers and electrified heating, aluminum content scales directly with circuit-kilometres added.

Beyond grids, aluminum also benefits from EV lightweighting (aluminum body panels, battery panels and battery enclosures offset heavier battery packs to preserve range) and from solar PV racking and mounting structures, both of which layer on top of the grid-driven demand.

Silver enables solar panels — manufacturers have cut silver use per panel by 19%, but panel deployment is growing 15% a year, more than offsetting the savings. Rare earths, mainly neodymium and praseodymium, go into the magnets used in wind turbines, EV motors and, increasingly, AI data center hardware.

COPPER'S SUPPLY PROBLEM

The true structural bottleneck of the Age of Electricity lies on the supply side, where copper production faces an inescapable supply squeeze. Global mine output is forecast to peak by 2030, just as demand from AI data centers, defense modernization, and EVs accelerates. The industry is battling a severe, multi-decade degradation in asset quality. Global copper ore grades have plummeted 40% since 1991. Consequently, miners must now excavate and process nearly double the volume of rock just to extract the same metric ton of pure copper.

Simultaneously, the global discovery pipeline has effectively dried up due to physical geological limits. Over the past decade, explorers identified just 14 major copper deposits worldwide, a staggering drop from the 225 major discoveries made in the preceding 23 years. Money can no longer buy immediate supply response. The average lead time to bring a greenfield discovery into commercial production has stretched to 17 years due to complex permitting, stringent environmental mandates, and judicial reviews. Mine supply is set to peak at only around 33 million tonnes in 2030 before it starts to decline, covering just 70% of 2035 demand, a gap that could widen to 10 million tonnes by 2040. The world may be entering an acute supply shortage of the metal it needs the most in the age of electricity.

SILVER AND RARE EARTH AVAILABILITY IS ALSO CONSTRAINED

Silver and rare earths have their own supply headaches. About three-quarters of silver comes as a byproduct of copper, lead and zinc mining. We are in the sixth straight year of deficit. Silver's 2026 deficit is forecast at 46.3 million ounces and the Silver Institute expects annual deficits of 50–80 million ounces to persist right through 2030 unless a wave of new supply arrives. Rare earth processing is concentrated in China, which has tightened export controls; Western alternatives remain tiny by comparison, and prices have jumped sixfold this year. Aluminum is better supplied but still concentrated in a handful of countries and is running its own modest deficit.

PLAYING THIS FROM INDIA

Indian companies with copper exposure are converters (reliant on TC/RC margins) not miners that own the ore, so there is no clean local proxy for the copper leg of this theme. Aluminum is different. Hindalco, Vedanta and Nalco are fully integrated, bauxite-to-metal producers building global scale capacities, each sourcing its own low-cost captive bauxite (India has some of the finest grades of gibbsitic bauxite, globally). Hindustan Zinc is India's only producer of silver, which it mines as a byproduct.

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OUR OFFICES

SINGAPORE

Singapore

16 Collyer Quay #11-02
Collyer Quay Centre
Singapore 049318
+65 6713 0570

UAE

Dubai

The Exchange, Gate Village 11
Unit 802, DIFC
PO Box 507026, Dubai
+971 4 586 1500

UNITED KINGDOM

London

24 Hanover Square
London W1S 1JD
+44 1642 843 487

INDIA

Mumbai

Unit 507/508, A Wing, INS Tower, G Block, BKC, Mumbai
-400051

New Delhi

Unit 104A, Worldmark 2, Aerocity, New Delhi 110037

Bengaluru

1st Floor, WeWork 37, Cunningham Cross Rd, Vasant
Nagar, Bengaluru 560001

Chennai

RK Swamy Centre, Hansa Building, Door No: 3,
Thousand Lights, Chennai 600006

Hyderabad

Suite 502, Building 450, Central Plaza, Genome Valley,
Shameerpet, Hyderabad 500078

Gandhinagar

Unit FF-10, Pragya Accelerator, Block 15T, GIFT CITY,
Gujarat 382355

✉ info@lighthouse-canton.com

in Lighthouse Canton