CWIEME BERLIN

3-5 JUNE 2025
MESSE BERLIN

A Hyve Event

Unlocking the future of copper: supply security, recycled content, sustainability

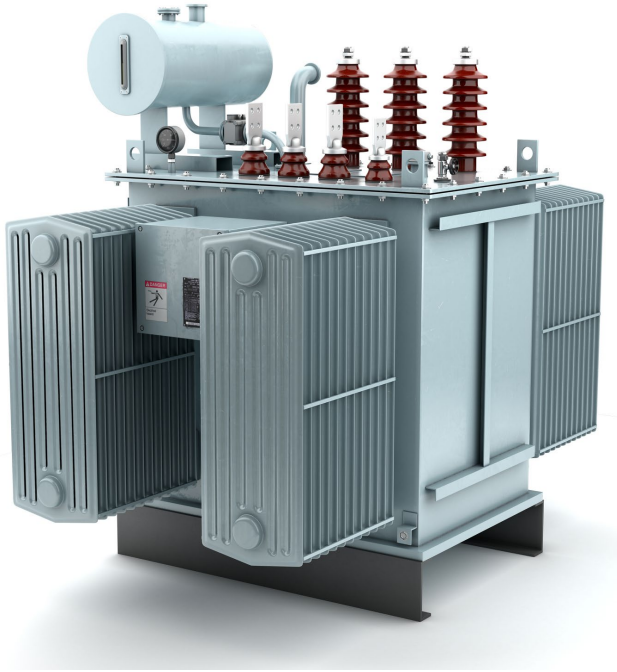
Fernando Nuño – International Copper Association

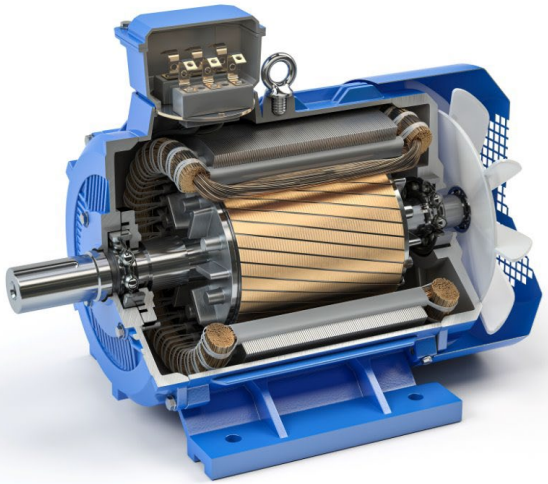
International Copper Association Europe

Unlocking the future of copper: supply security, recycled content, sustainability

CWIEME – Berlin 2025

Fernando Nuño





International Copper Association

01
PROMOTE

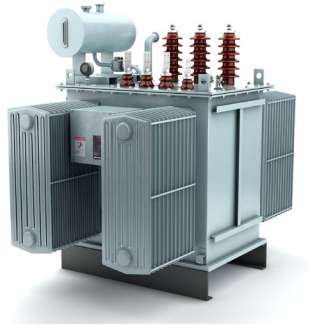
Promote – Be *The* voice of copper and ICA members

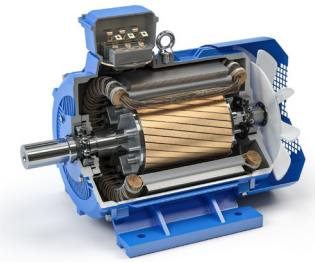
PROTECT
02

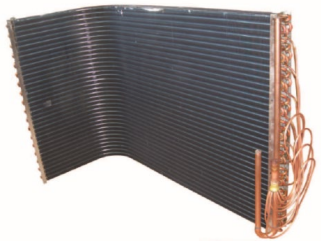
Protect the market and the industry by reducing regulatory barriers and ensuring acceptance of copper

03
DEFEND

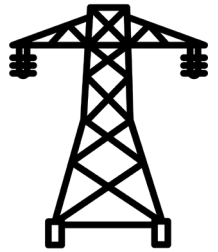
Defend and sustain copper demand in key applications







Regulatory context relevant for raw materials for motors and transformers



Security of supply

Sustainability

Grids

Net Zero Industry Act

European Grid Package

Critical Raw Materials Act

Ecodesign - ESPR

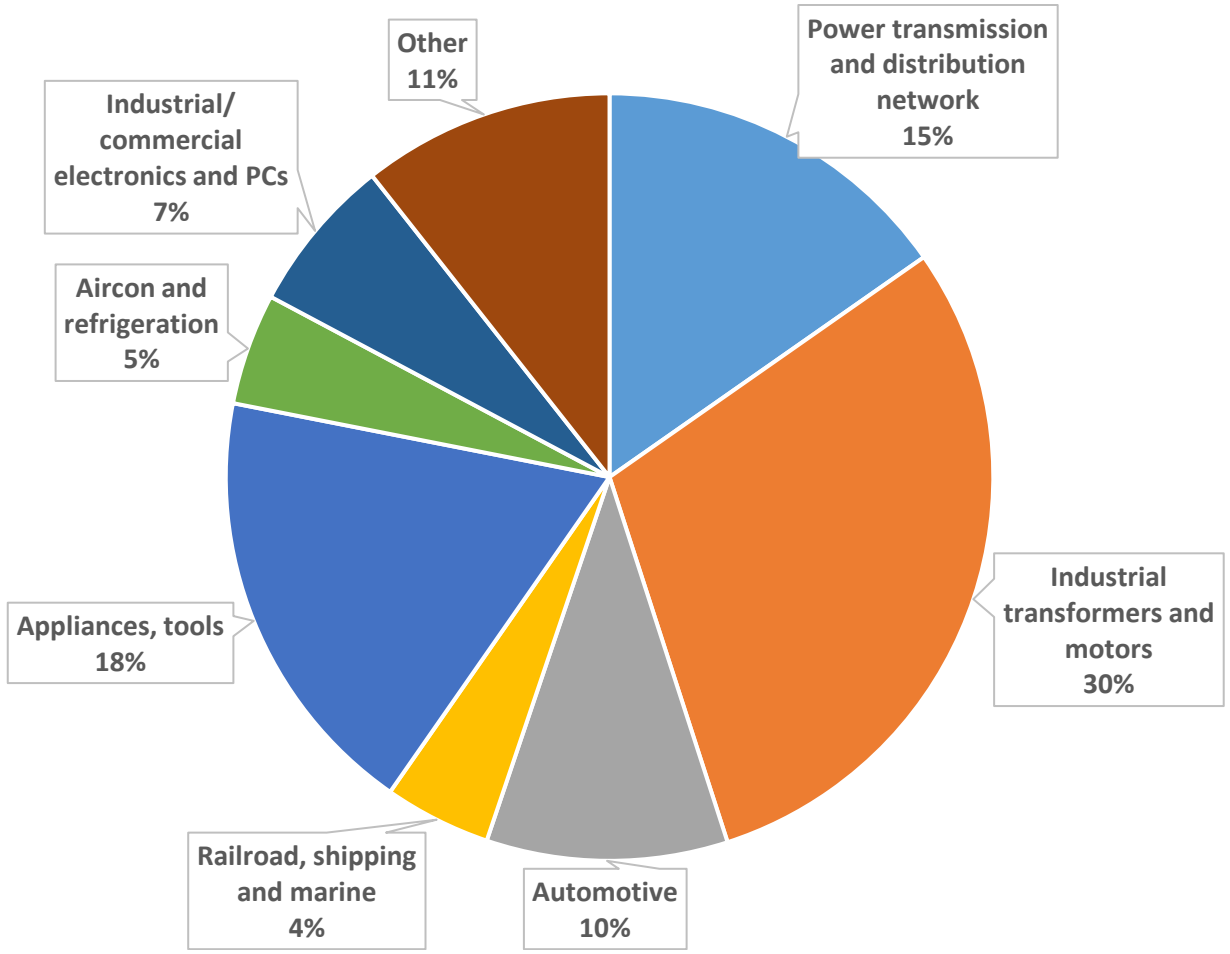
Corporate Sustainability

Emissions: ETS, CBAM

Circular Economy Act

Copper is a key material for winding wire in transformers and motors

About 400 kton/year of copper are used in winding wire in EU27 + UK, representing ~15% of total copper demand in the region.



Share of winding wire uses

https://internationalcopper.org/resource/global-2022-semis-end-use-data-set/

Questions being raised by OEMs, utilities and the value chain

A strong EU supply chain

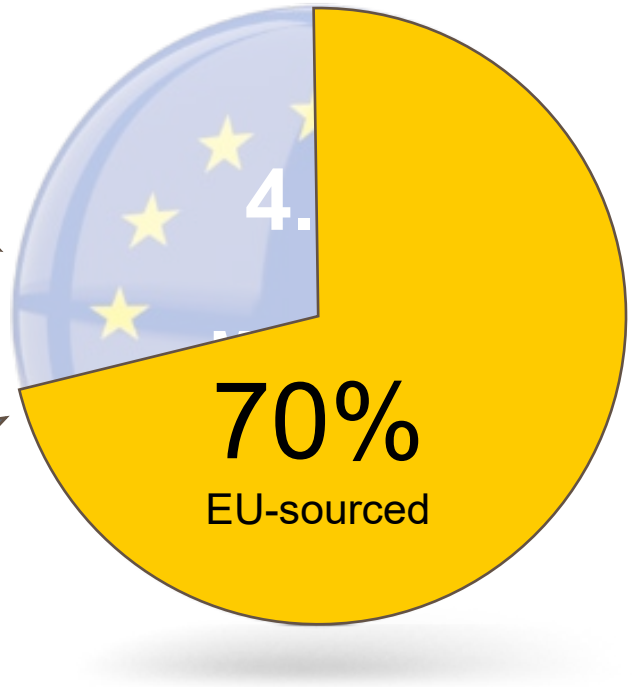
EU copper demand

Figures of 2022, Sources: ICSG, IWCC, ICA Stocks & flows model, and own calculations, rounded numbers considering net imports or exports

EU sources domestically 70% of its demand

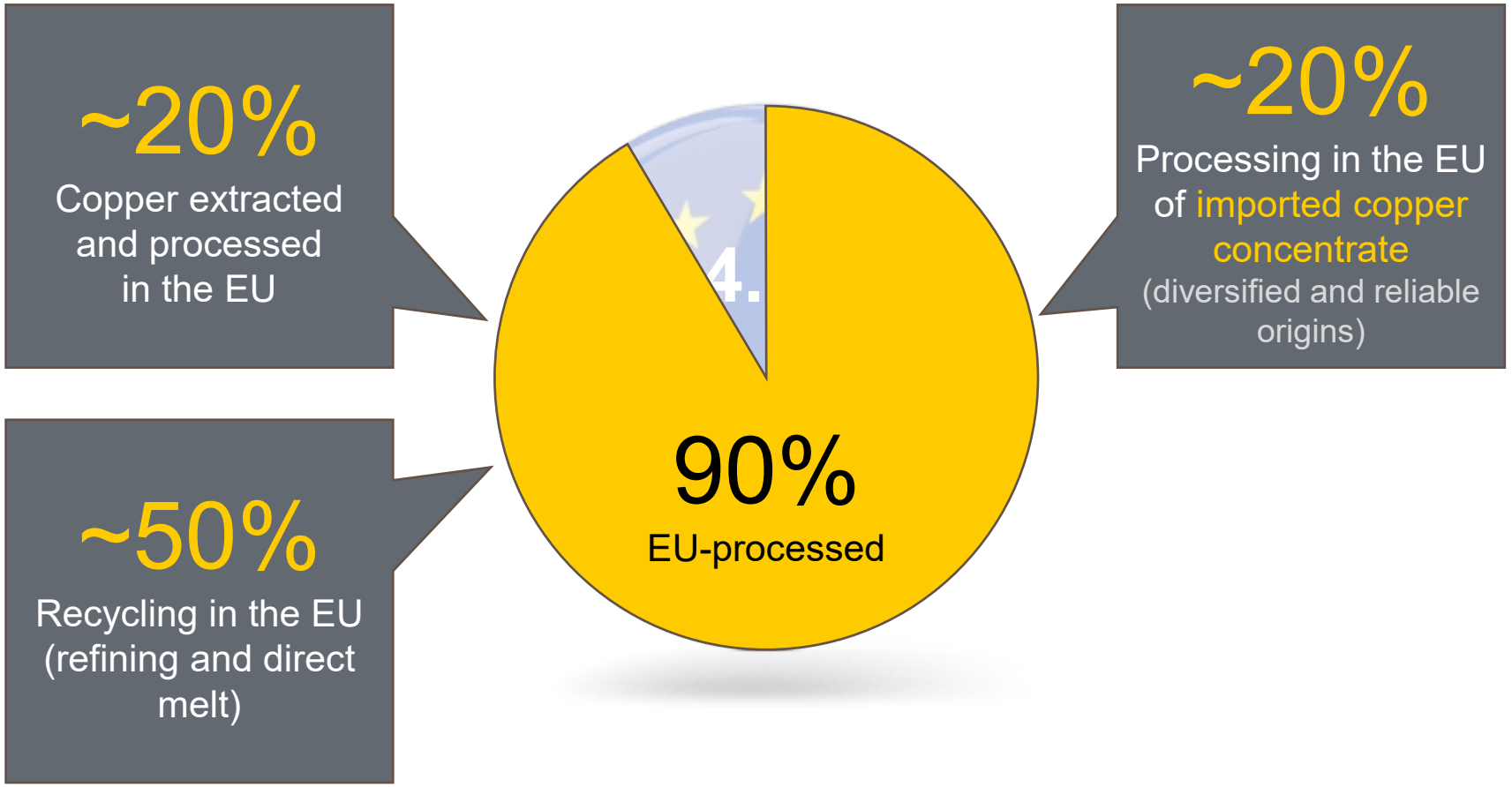
~20%
Copper extracted and processed in the EU

~50%
Recycling in the EU (refining and direct melt)



Figures of 2022, Sources: ICSG, IWCC, ICA Stocks & flows model, and own calculations, rounded numbers considering net imports or exports

EU processes domestically 90% of its demand



Figures of 2022, Sources: ICSG, IWCC, ICA Stocks & flows model, and own calculations, rounded numbers considering net imports or exports

Most of EU copper demand is met by domestic smelting, refining and recycling capacity

~20%
Copper extracted and processed in the EU

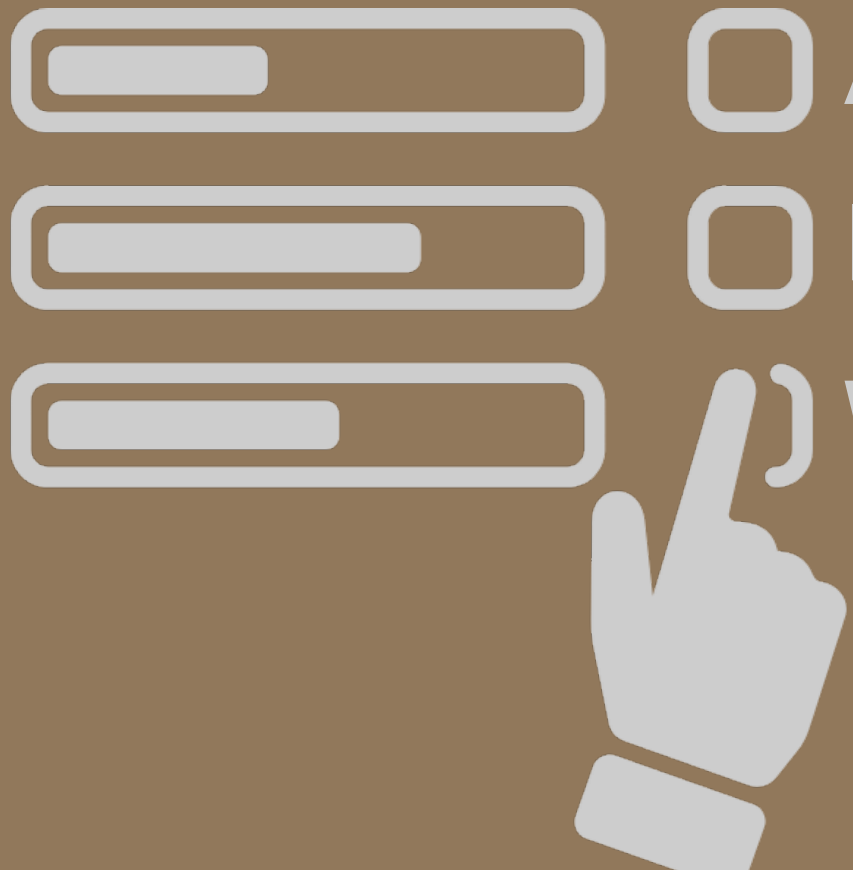
~50%
Recycling in the EU (refining and direct melt)

~20%
Processing in the EU of imported copper concentrate

~10%
Imported refined copper

Figures of 2022, Sources: ICSG, IWCC, ICA Stocks & flows model, and own calculations, rounded numbers considering net imports or exports

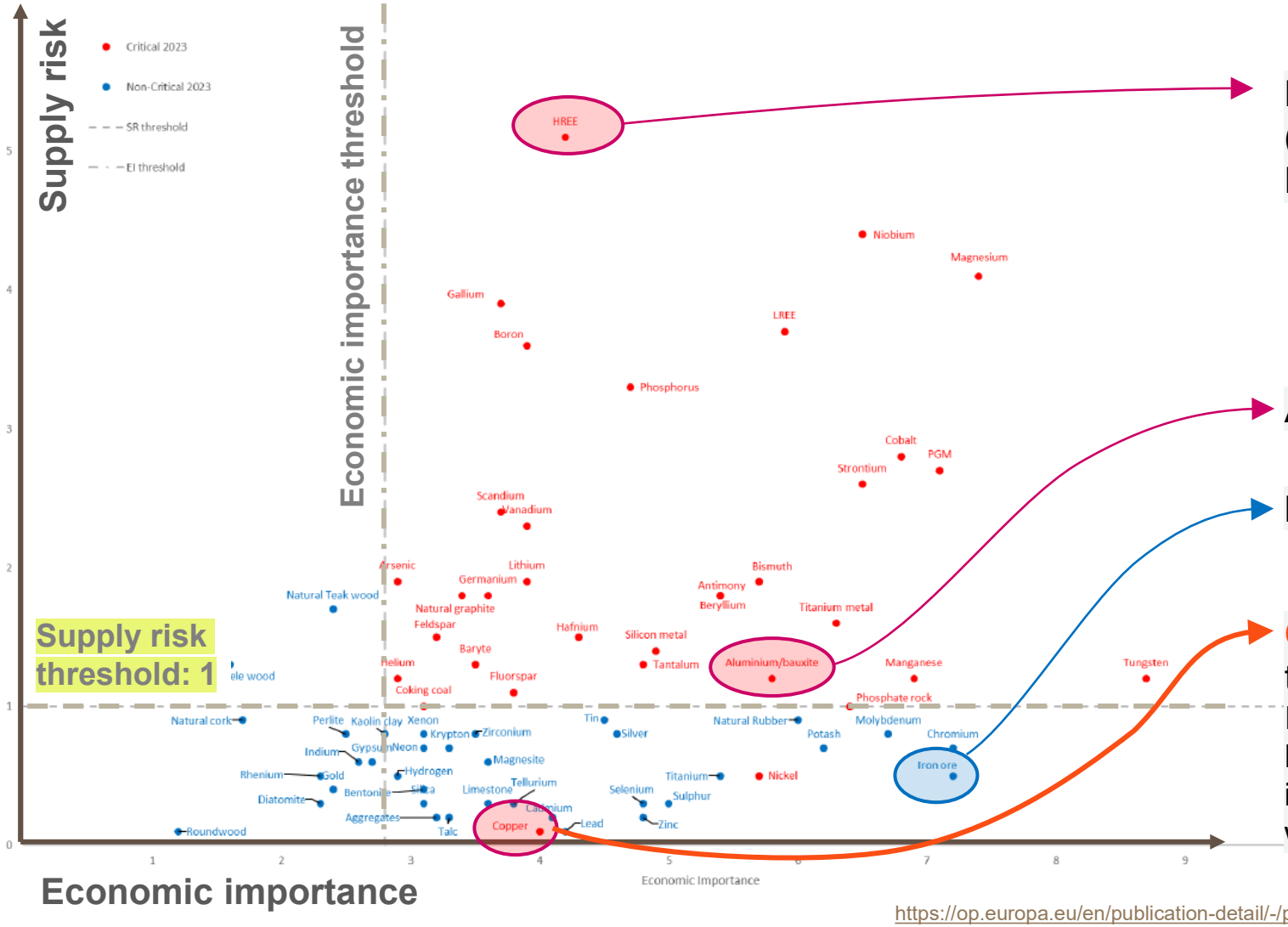
How is the supply risk assessment for copper according to the European Commission?



- **Above** the threshold
- **Below** the threshold
- **Well below** the threshold

The European Commission assessment shows that copper is well below the supply risk threshold

According to the European Commission JRC 2023 Study on the critical raw materials for the EU, 34 materials are proposed for the critical raw material list, of which copper and nickel do not meet the criticality thresholds but are included as Strategic Raw Materials.



Rare earths: >5
(Permanent magnets)
Maximum supply risk

Aluminium / Bauxite: 1.2

Iron ore: 0.5

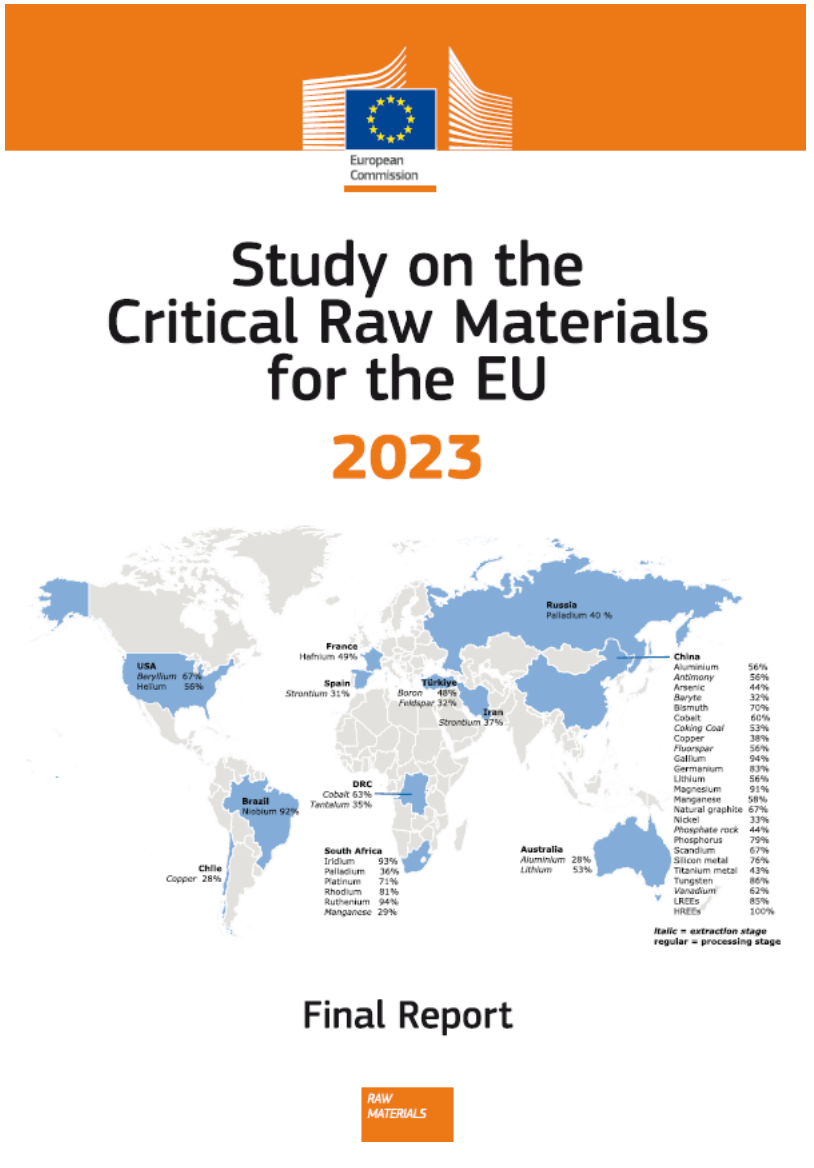
Copper: 0.1 well below the threshold for supply risk. Included as a **Strategic** Raw Material because of its importance in strategic technologies*, together with nickel

Study on the critical raw materials for the EU 2023
https://op.europa.eu/en/publication-detail/-/publication/57318397-fdd4-11ed-a05c-01aa75ed71a1

* Supply chain analysis and material demand forecast in strategic technologies and sectors in the EU – A foresight study
https://ec.europa.eu/docsroom/documents/54115/attachments/1/translations/en/renditions/native

Copper is strategic, **not** critical

*"Copper, being a Strategic Raw material, is used in very large quantities of 20 Mt in 2020 for electrification across all strategic technologies. **Its supply is very well diversified**, therefore it has not been considered critical before. However, it is challenging to substitute due to its superior performance in electrical applications and improve secondary supply due to very long lifecycle of copper in products."*



Source : Study on the critical raw materials for the EU 2023, European Commission, 2023
https://op.europa.eu/en/publication-detail/-/publication/57318397-fdd4-11ed-a05c-01aa75ed71a1

Cu

Copper already meets Critical Raw Materials Act thresholds

	Extraction	Processing & Refining	Recycling	Dependency of a single country
CRM Act 2030 targets	**10%**	**40%**	**25%**	**<65%**
Refined Copper 2020	**~ 20%**	**~ 90%**	**~ 50%**	

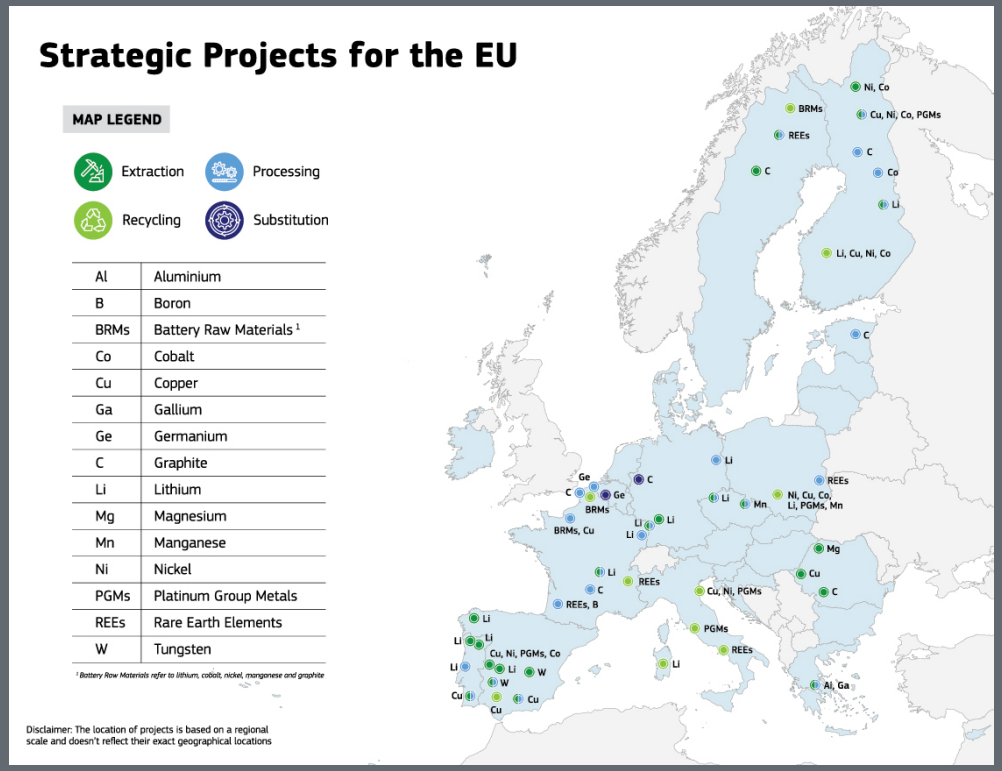
largest EU sources

mining	*refining*
Poland (19%)	Germany (17%)
Chile (14%)	Poland (14%)
Peru (10%)	Spain (11%)

Numbers from : Study on the critical raw materials for the EU 2023, European Commission, 2023
https://op.europa.eu/en/publication-detail/-/publication/57318397-fdd4-11ed-a05c-01aa75ed71a1

Despite meeting the thresholds, CRMA provides support to copper for further development of mining, smelting and refining

March 25 : among the 47 strategic projects that will receive support, **10 include copper**, from mining to recycling
This support will further improve the supply situation for copper in Europe



Takeaway

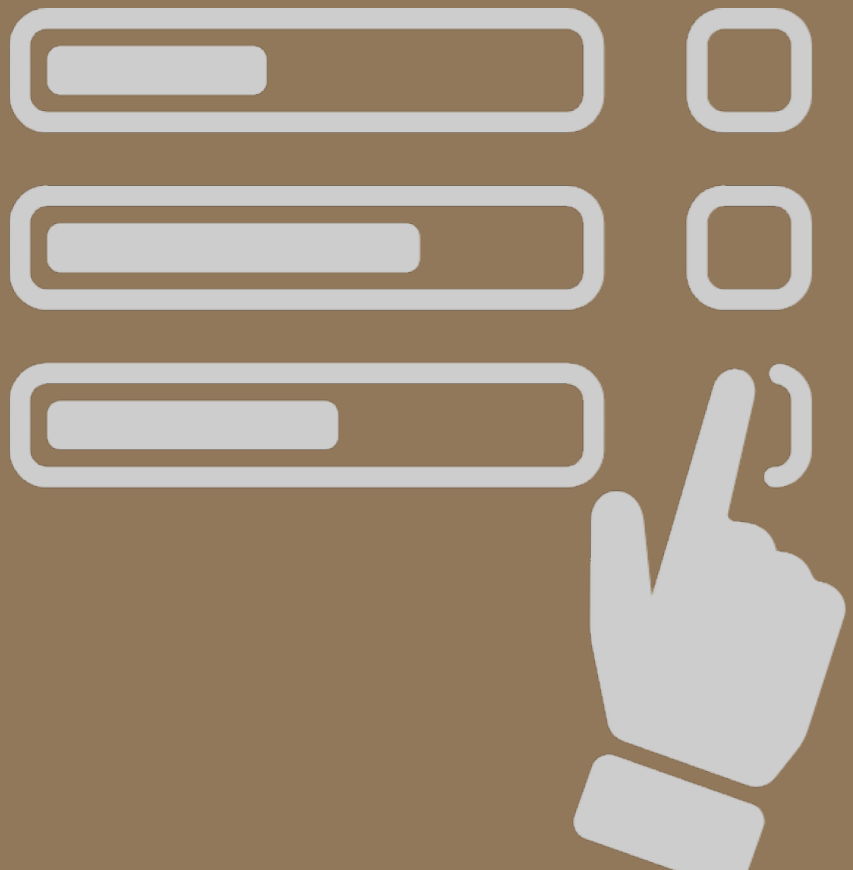
EU copper supply is secure and diversified

Copper has the lowest supply risk among key raw materials

The Critical Raw Materials Act further supports copper projects in Europe


Ok, but beyond the EU, what is the global situation?

Are there enough copper reserves and resources?



- We are running out of copper
- For a few years
- For tens / hundreds of years

A diversity of copper resources is available

Year 2022

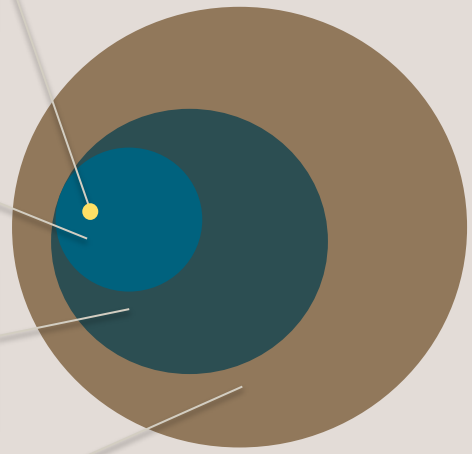
Primary route: mining

Annual production
22 Mtonnes

Reserves
890 Mtonnes
(**41 years**)

Identified resources
2100 Mtonnes
(**100 years**)

Total resources
5600 Mtonnes
(**>250 years**)



Deep sea deposits excluded

Secondary route: recycling

450 Mtonnes
available in the
“urban mine”

End-of-life scrap (post-consumer):
4 Mtonnes/year

Fabrication scrap (pre-consumer):
4 Mtonnes/year

Landfills

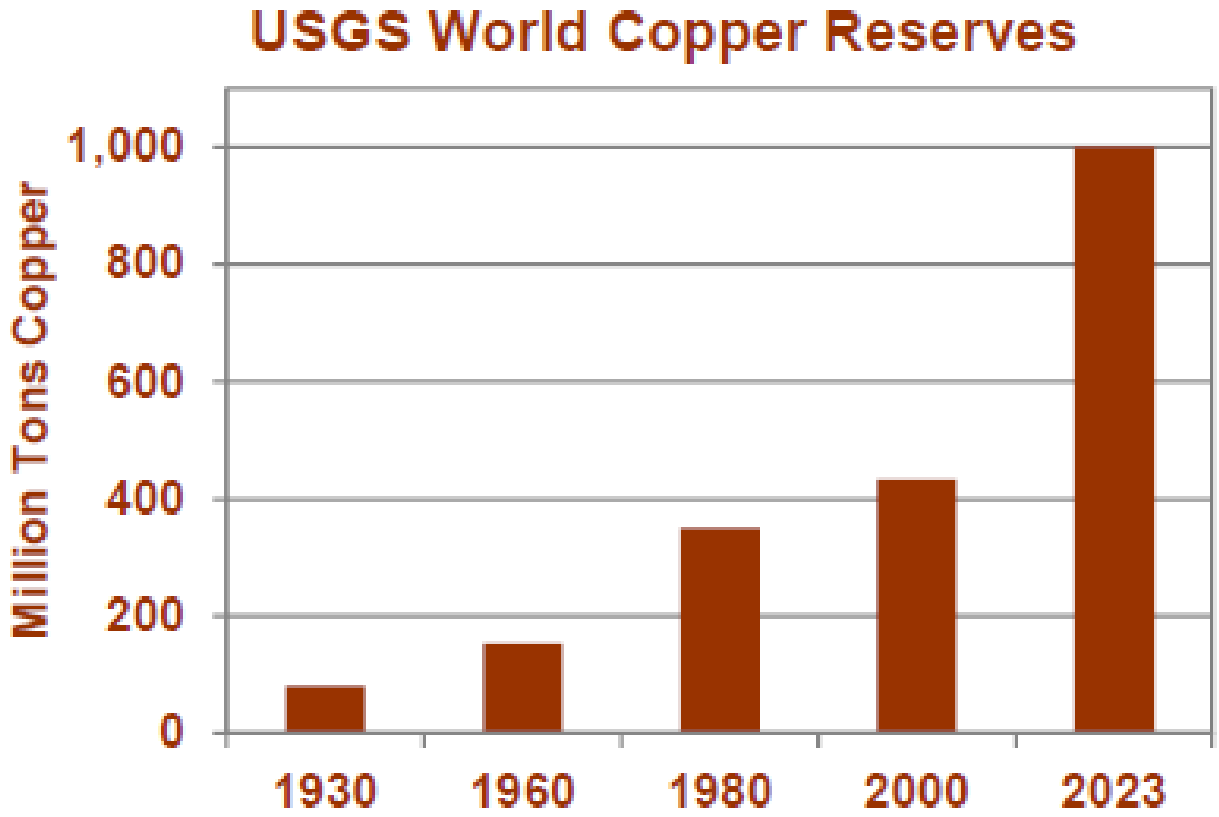
150 Mtonnes in landfills

ICSG - The World Copper Factbook 2023: https://icsg.org/copper-factbook/
Dynamic Analysis of Global Copper Flows: https://pubs.acs.org/doi/10.1021/es400069b
US Geological Survey (USGS), 2023: https://www.usgs.gov/centers/national-minerals-information-center/copper-statistics-and-information
Meeting future copper demand: https://sustainablecopper.org/meeting-future-copper-demand/

Reserves are continuously revised upwards

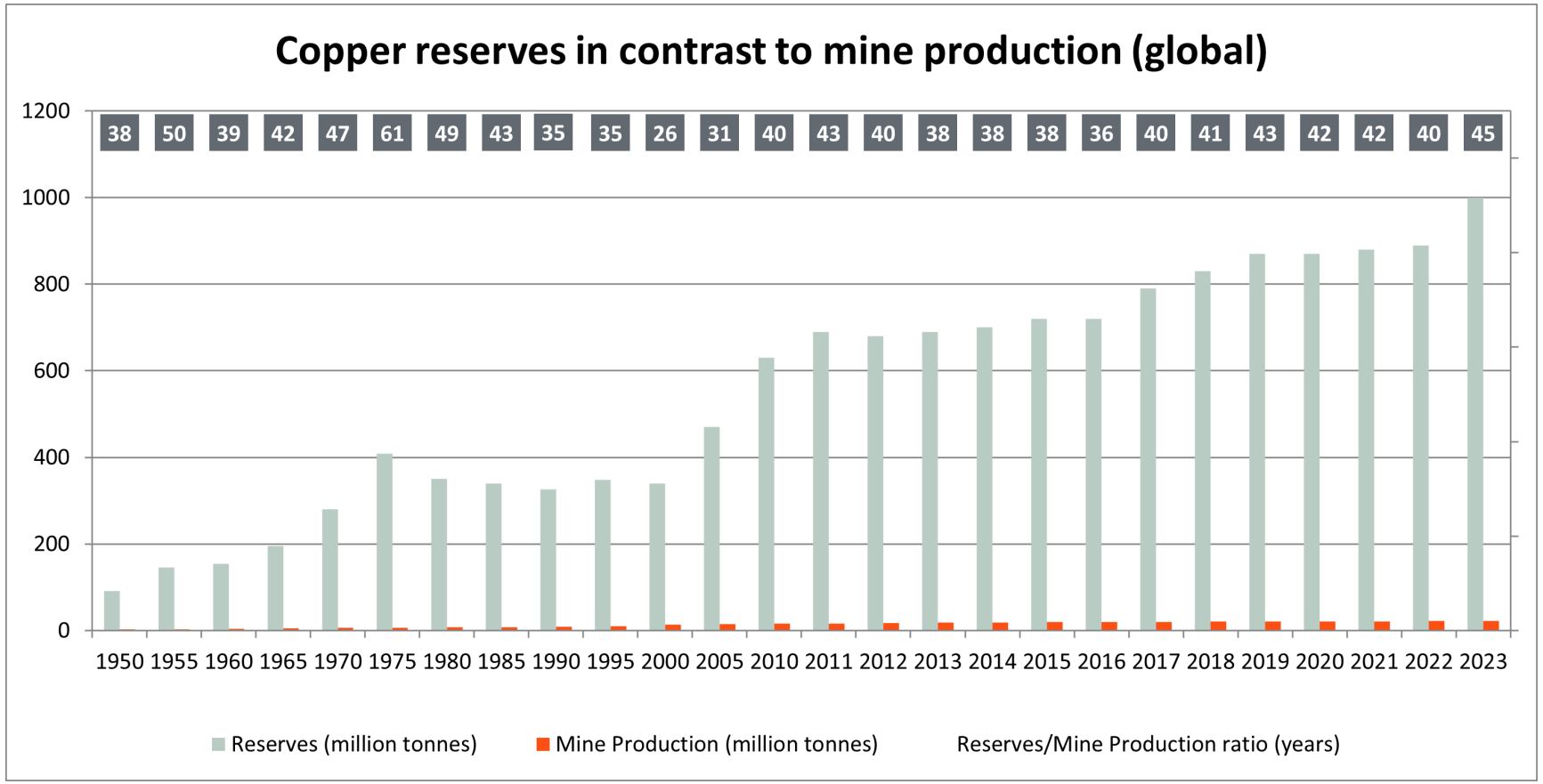
Reserves are continuously revised by mining companies, which means that today's picture cannot be considered as fixed for the years to come.

This is because, over time, new reserves are added, as the companies update their knowledge on their resources (additional exploration) and integrate new technological progress and economic factors.



Source : The World Copper Factbook 2024 https://icsg.org/copper-factbook/

Copper reserves have consistently averaged a 40-year supply



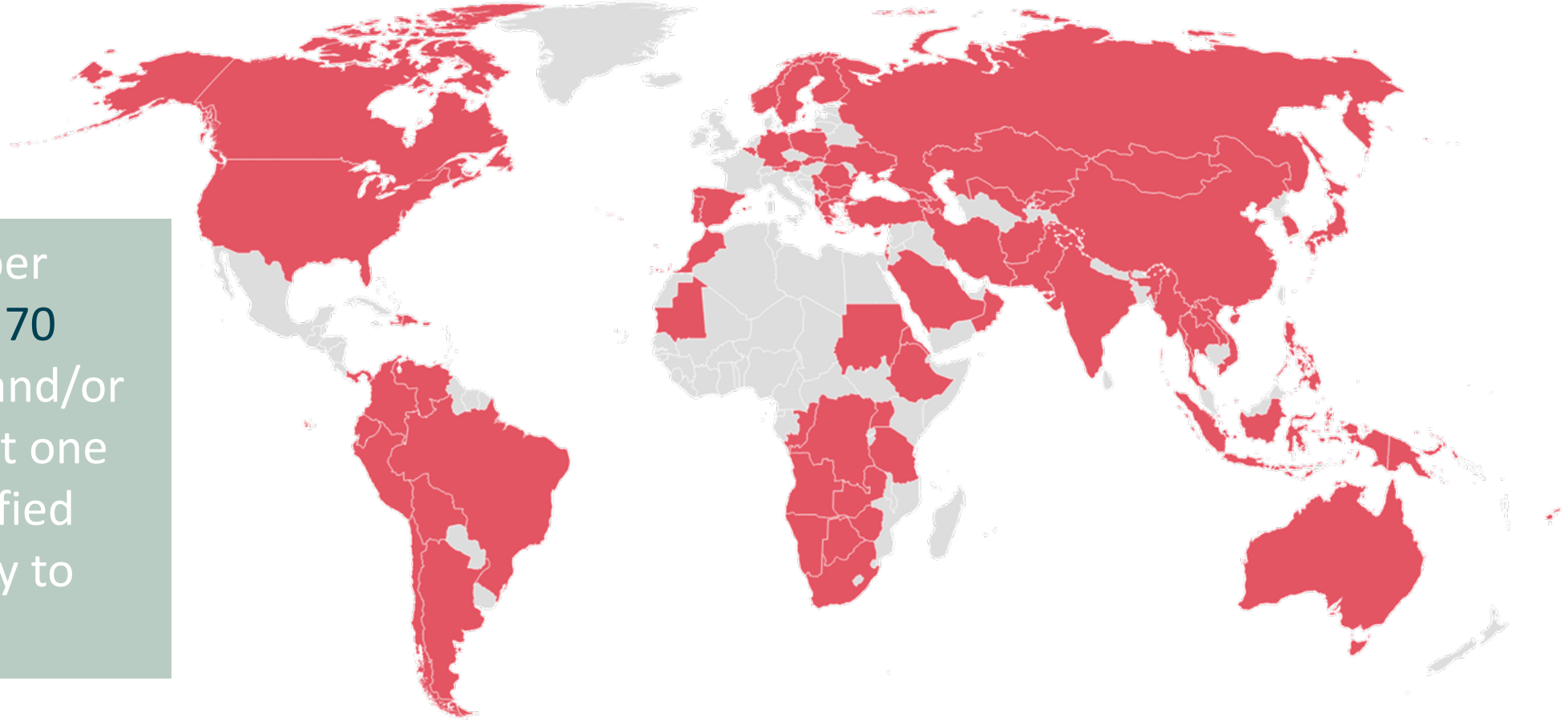
Since 1950, there has always been, on average, **40 years of copper reserves** and over 200 years of resources remaining.

Source: https://internationalcopper.org/sustainable-copper/about-copper/cu-demand-long-term-availability/ according to United States Geological Survey 2023

Cu

Copper supply is second most diversified of all metals

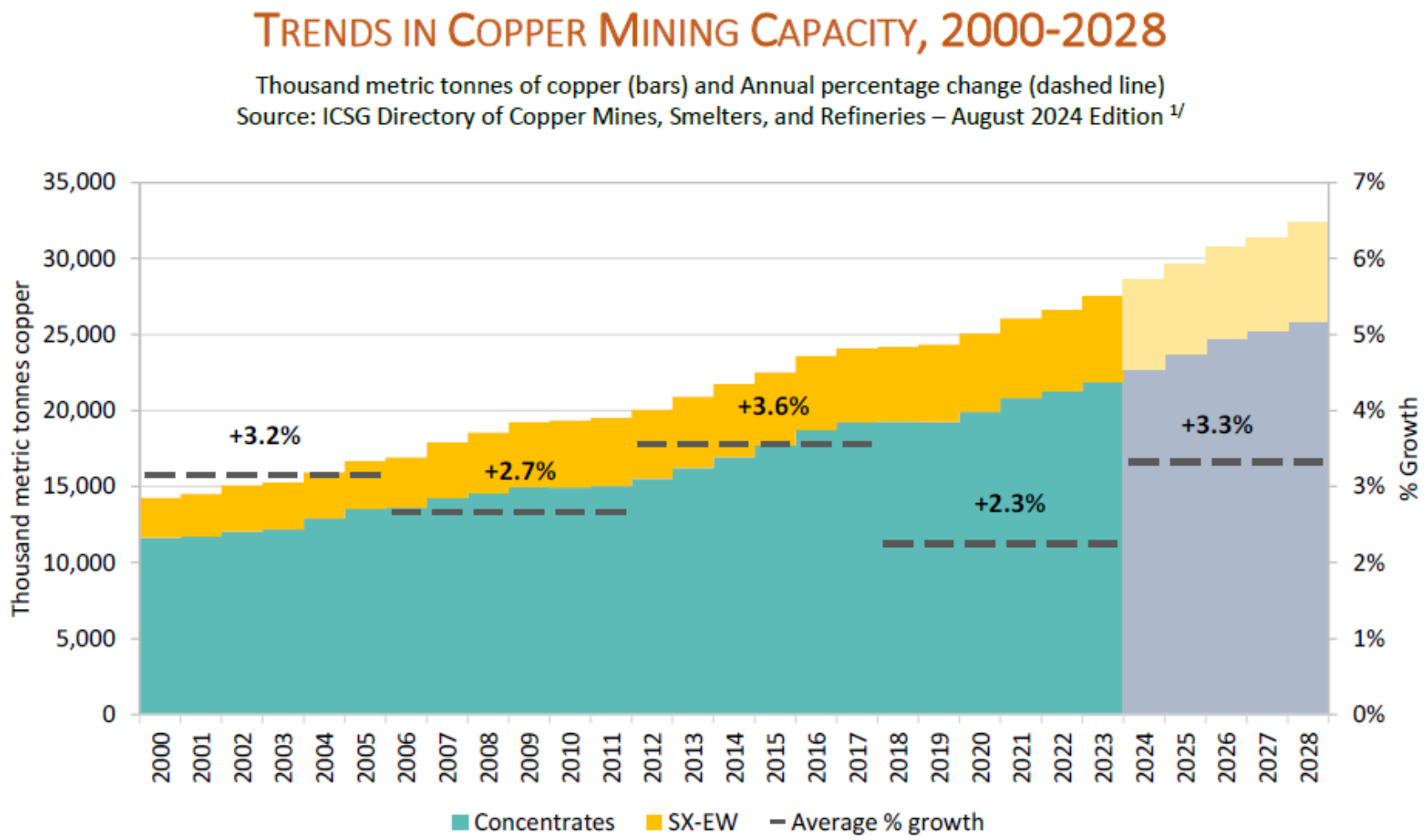
Production of copper takes place in over 70 countries (mining and/or smelting), making it one of the most diversified metals, second only to gold.



Source: ICSG statistical yearbook 2022 for the identification of countries with copper production capacity. Map produced by ICA using Datawrapper

ICA Europe - CWIEME 2025

Mining capacity until 2028 expected to grow at historic rates



Copper mining capacity is estimated to reach 32.4 million tonnes by 2028, with 20% coming from SX-EW and 80% from concentrates. This will be 18% higher than the global capacity of 27.5 million tonnes recorded in 2023. Growth in copper mine capacity is expected to average 3.3% per year going forward as new capacity is added at existing and some new operations. The capacity utilization rate, which is the ratio between production and capacity, stood at 81% in 2023.

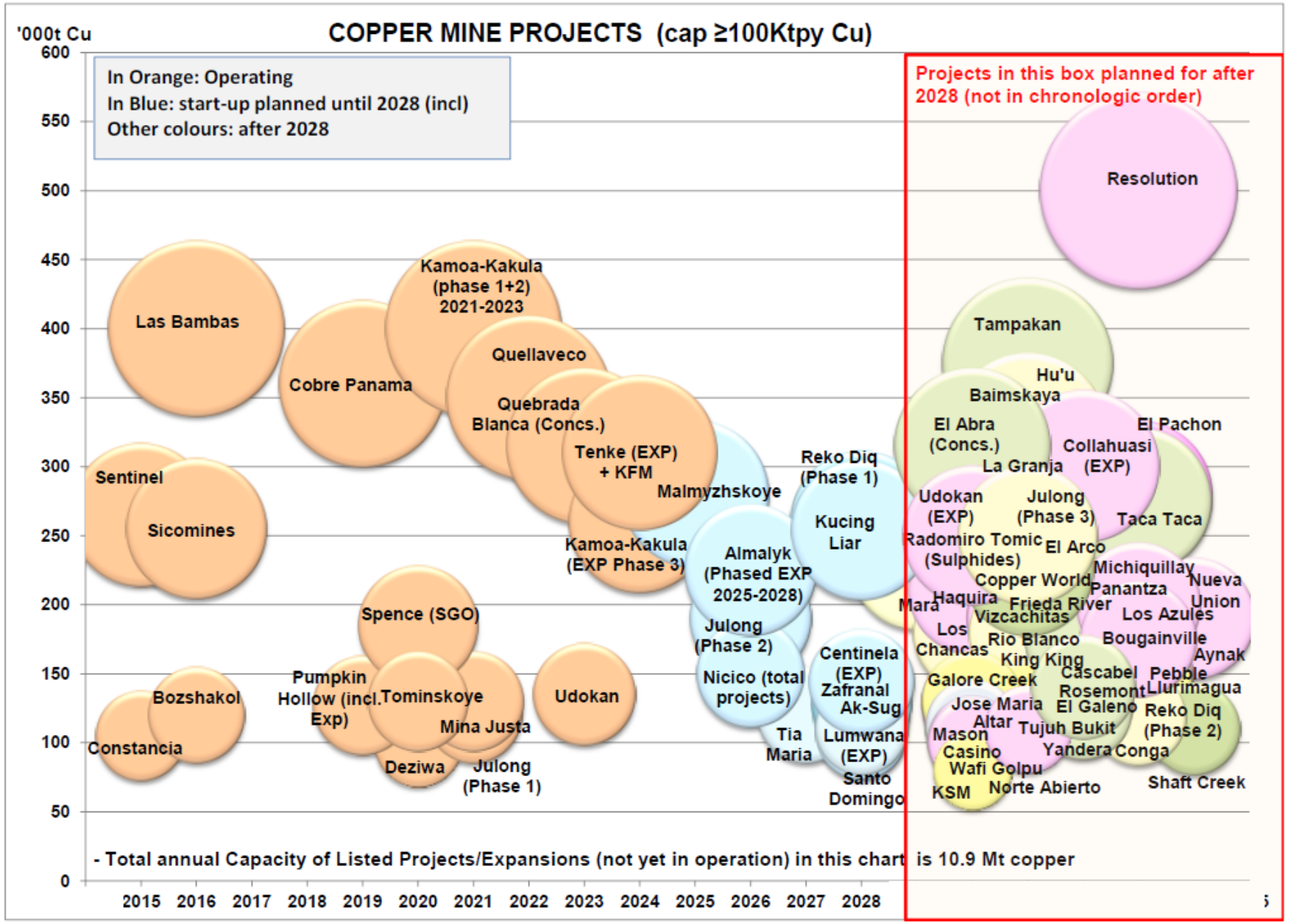
Note: Capacity data reflects production capabilities not necessarily production forecasts
1/ Available for sale - See our Publications Order Form on Page 61

Source : The World Copper Factbook 2024 https://icsg.org/copper-factbook/

Mining capacity beyond 2028

2023 mine production: 22 Mton

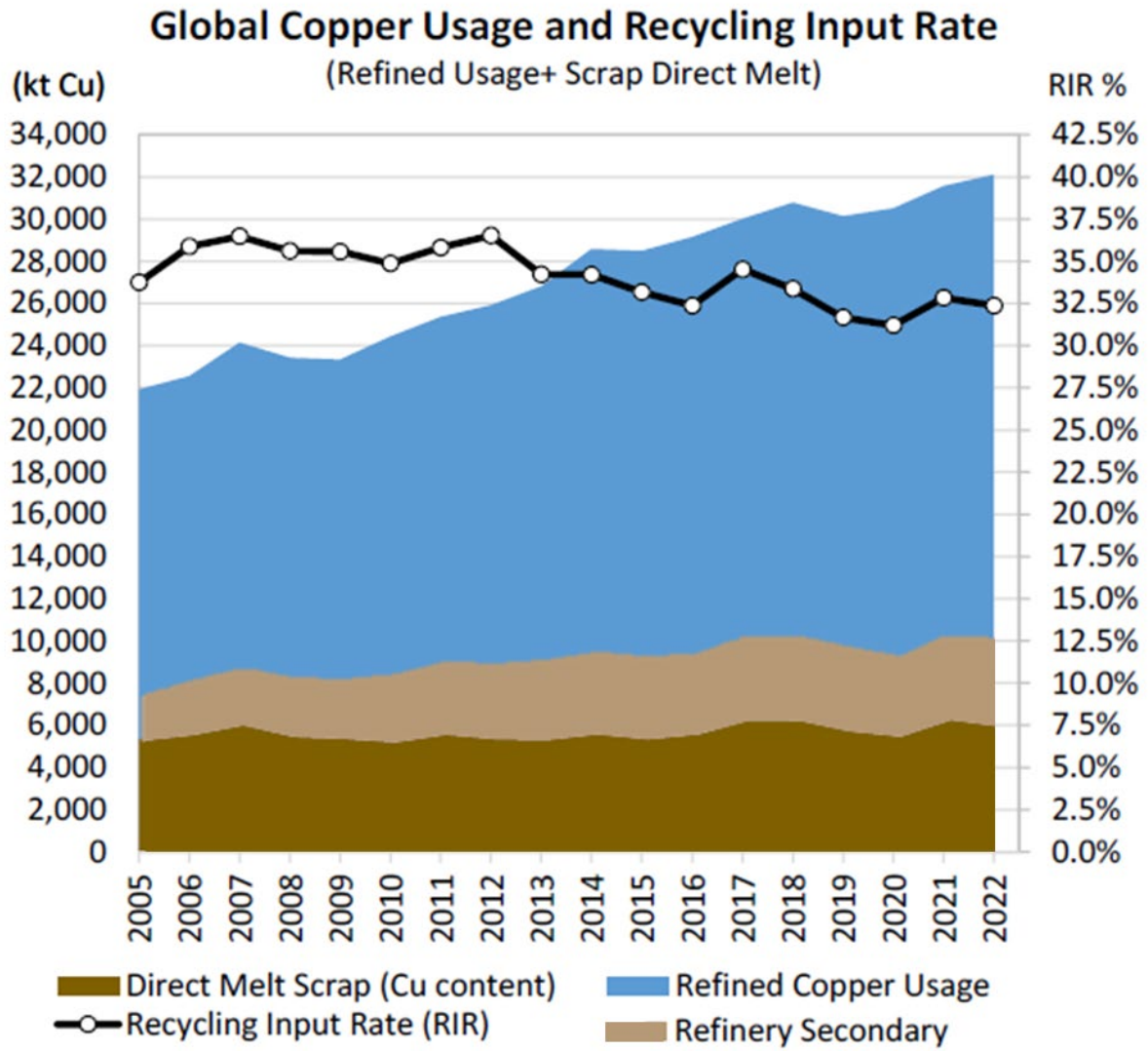
New mining projects: (annual capacity) **11 Mton**



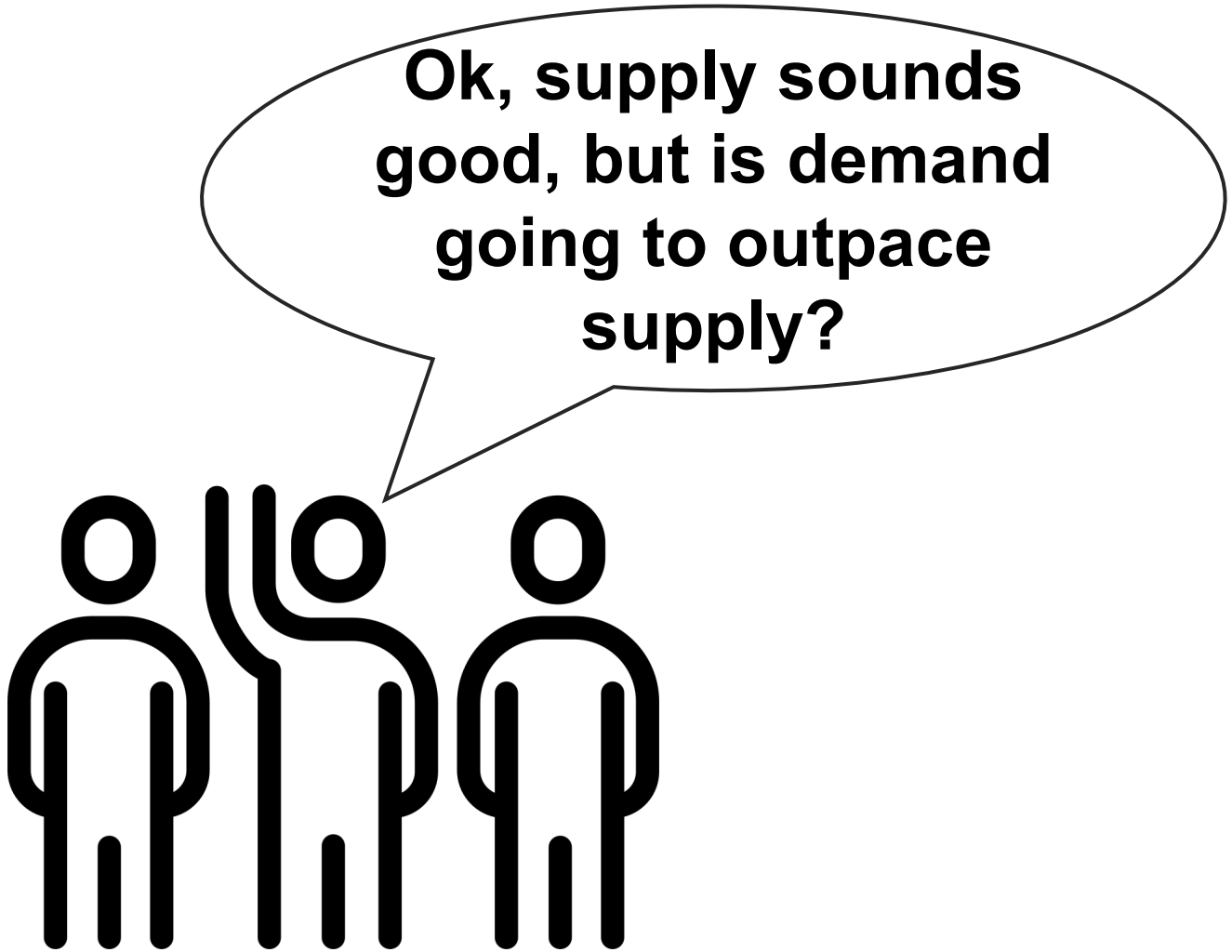
Source: ICSG Directory of Copper Mines, Smelters, and Refineries

Link: The World Copper Factbook 2024 https://icsg.org/copper-factbook/

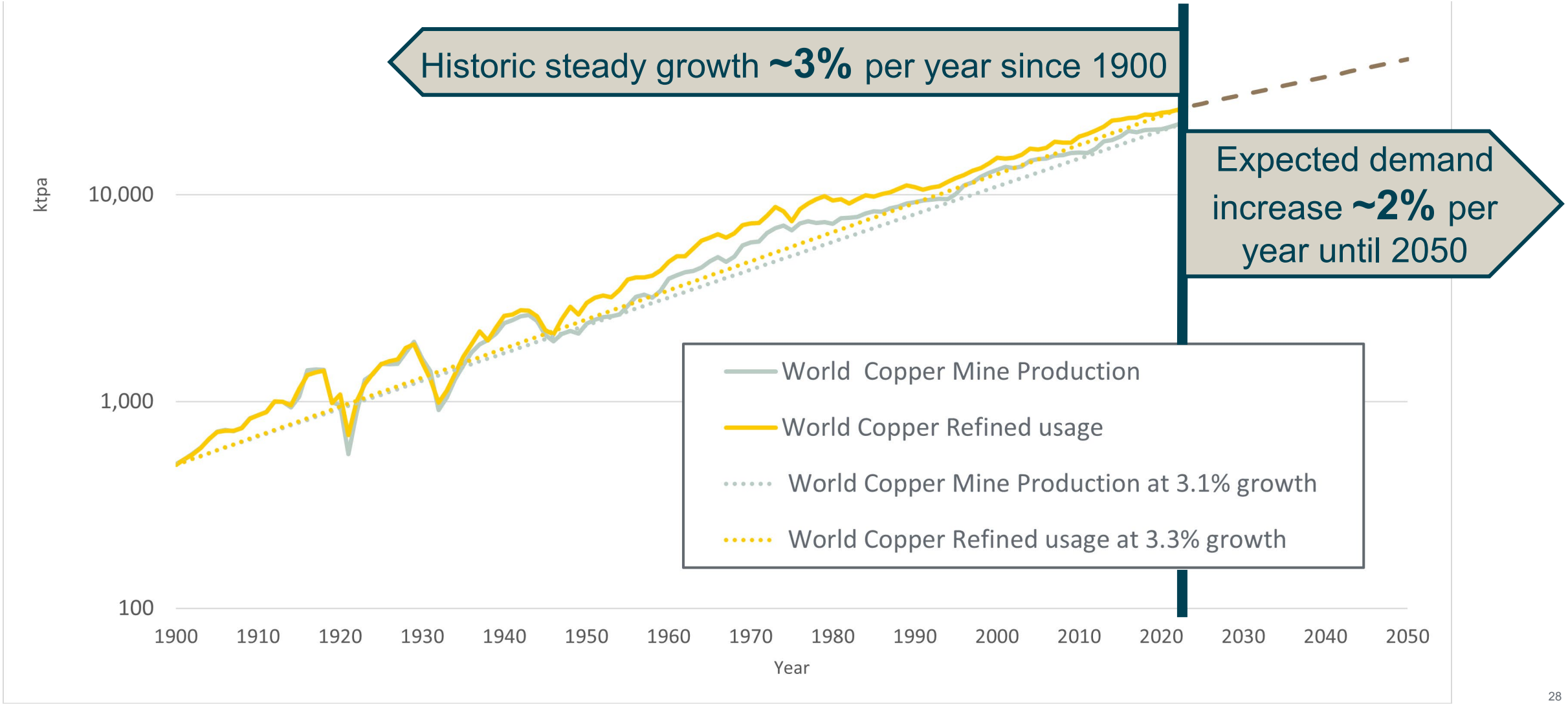
Beyond mining, recycled copper contributes to supply more than 30% of global usage



Source: ICSG - The World Copper Factbook 2023 https://icsg.org/copper-factbook/


Ok, supply sounds good, but is demand going to outpace supply?

Copper demand continues a 100-year trend of steady growth, but at an expectedly lower rate



Based on multiple data sources: ICSG, IEA, ICA

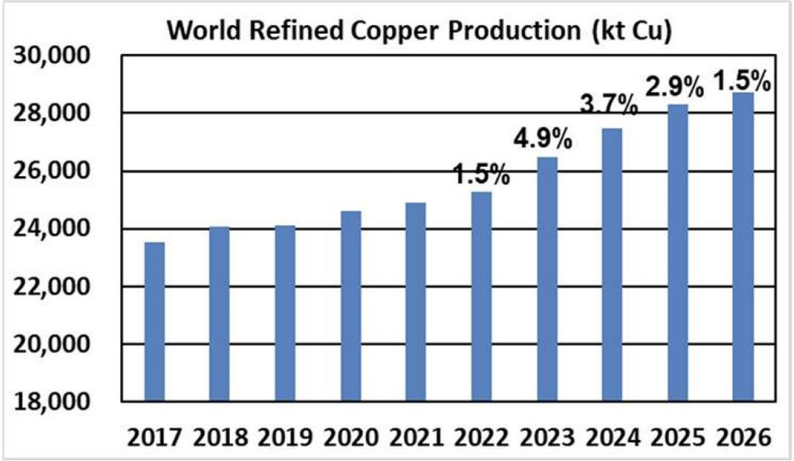
ICSG forecasts a surplus in supply for 2025 and 2026

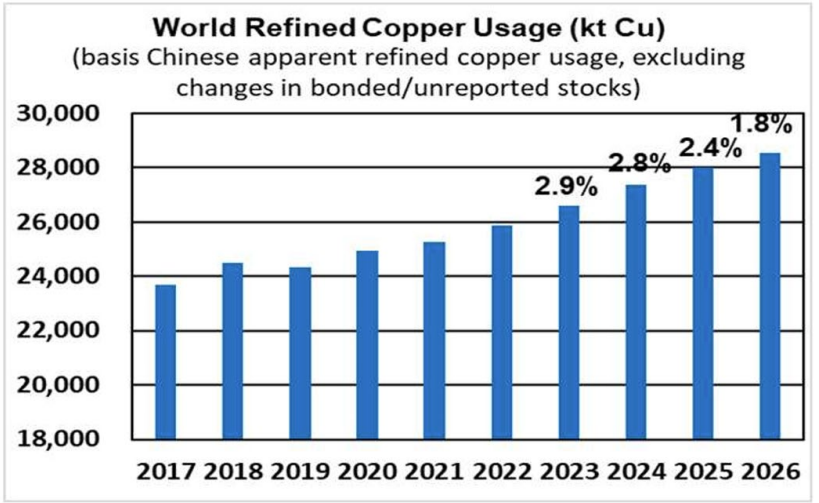
World refined copper balance projections indicate a **market surplus** of about **289,000 tonnes** for 2025 and **209,000 tonnes** for 2026:

Copper Mine Production: Growth expected at 2.3% in 2025 and 2.5% in 2026, driven by new and expanded mining operations, particularly in the DRC, Mongolia, and China.

Refined Copper Production: Forecasted to rise by 2.9% in 2025 and 1.5% in 2026, continuing to benefit from new and ramp-up capacity.

Copper Usage: Demand is projected to grow at 2.4% in 2025 and 1.8% in 2026, which is a revision of earlier predictions in view of the uncertainty surrounding international trade policy; however global usage is expected to continue to be supported by improvements in manufacturing activity in key end-use sectors





Source: ICSG Copper Market Forecast 2025-2026, https://icsg.org/press-releases/# 28 April 2025

Takeaway

There is enough copper in the earth and on the ground to cope with demand, but conditions need to be met to make it ready in a timely manner


Conditions for better social acceptance of responsible mining


New investments


More efficient permitting processes


Rollout of new mineral processing technologies


Increased copper recycling


Added circularity in copper-reliant systems


Supportive critical minerals policy frameworks

Cu

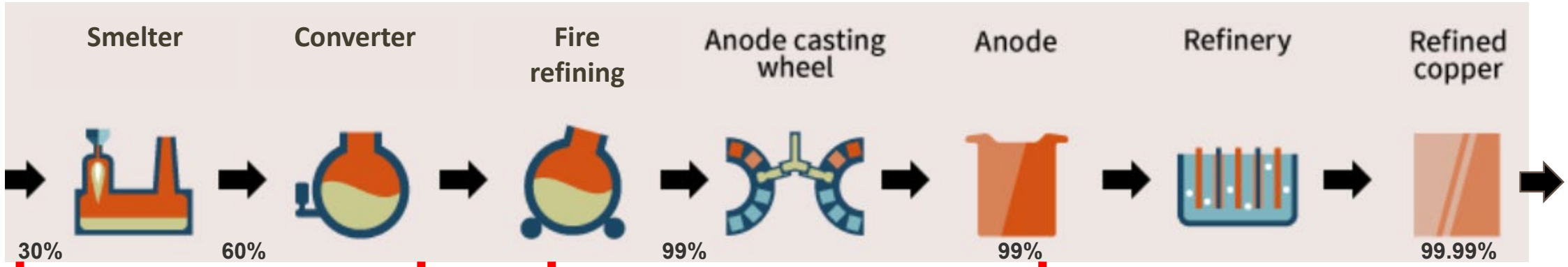
Recycled content

Questions being raised by OEMs, utilities and the value chain

Circularity : our society holds a massive urban copper mine

2/3 of all copper produced since 1990 is still in use, it represents 470 Mt

Recycling route depends on scrap purity and on product requirements, but same end purity can be reached with the right process



Scrap grade

<85% Cu

Smelting, converting & Refining

85% - 98% Cu

Refining (fire / electro)

>99% Cu

Melting

Directly returned to fabrication (depending on product requirement)

Recycled copper can meet the same metal exchange grade standards as primary copper

- The same refining process until required purity
- Purity depends on quality of input materials and process parameters
- Higher purity levels possible under the right conditions
- ★★★ For highest quality applications, the producer will select the best approach

ICA Europe - CWIEME 2025

Takeaway

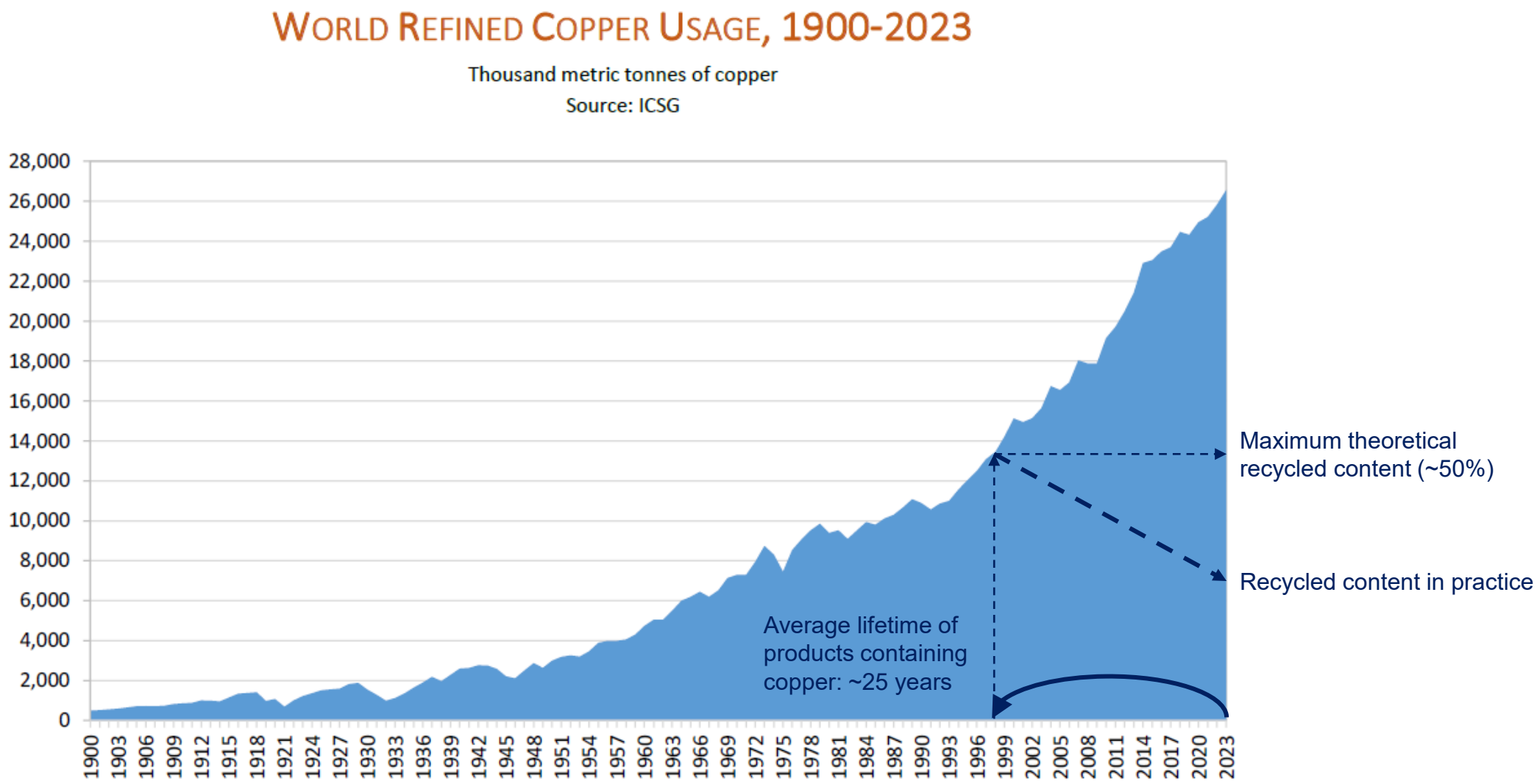
Yes, recycled copper can be used in your application

However:

- For highest quality applications, the producer will select the best approach
- Usually the production of copper mixes primary and secondary streams and optimal blends are defined according to the application (notably in wire rod for winding wire)


Great!
Then, I'll specify 100% recycled content in the products I purchase

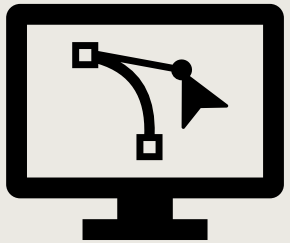
Recycled copper content: practical limits



Since 1900, apparent usage for refined copper has increased from less than 500 thousand tonnes to 26.5 million metric tonnes in 2023 as usage over the period grew by a compound annual growth rate of 3.3% per year.

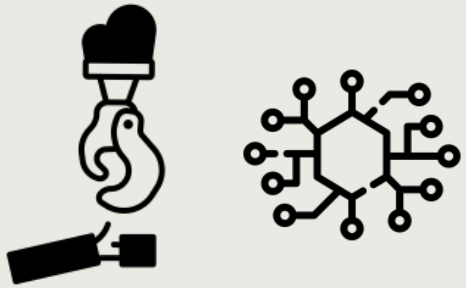
Source: The World Copper Factbook 2024 https://icsg.org/copper-factbook/

Factors affecting scrap availability



Design-for-recycling

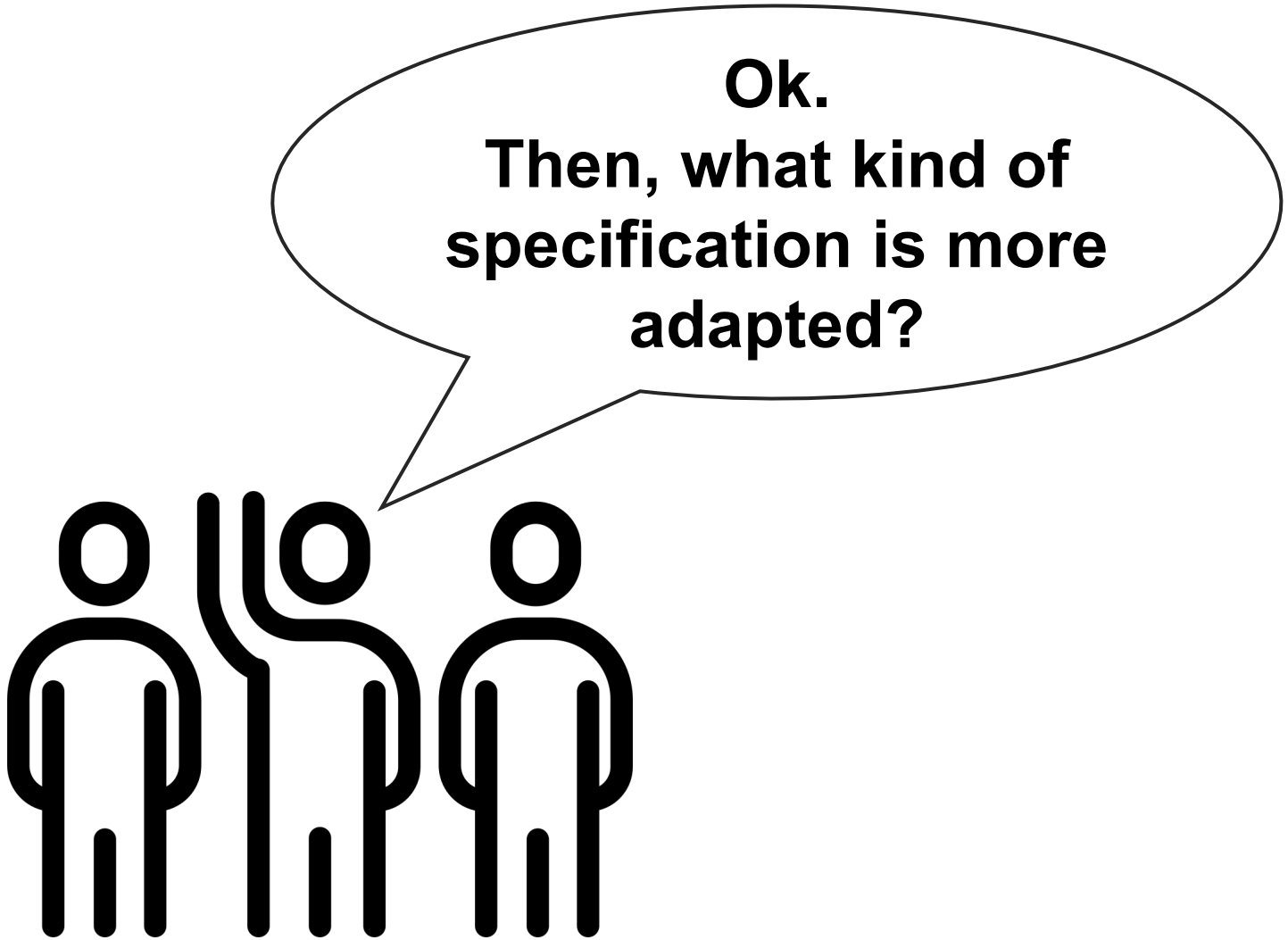
Incentives to improve collection rates



Progress in sorting technologies
Trained AI systems
Innovative shredding

Increasing product complexity

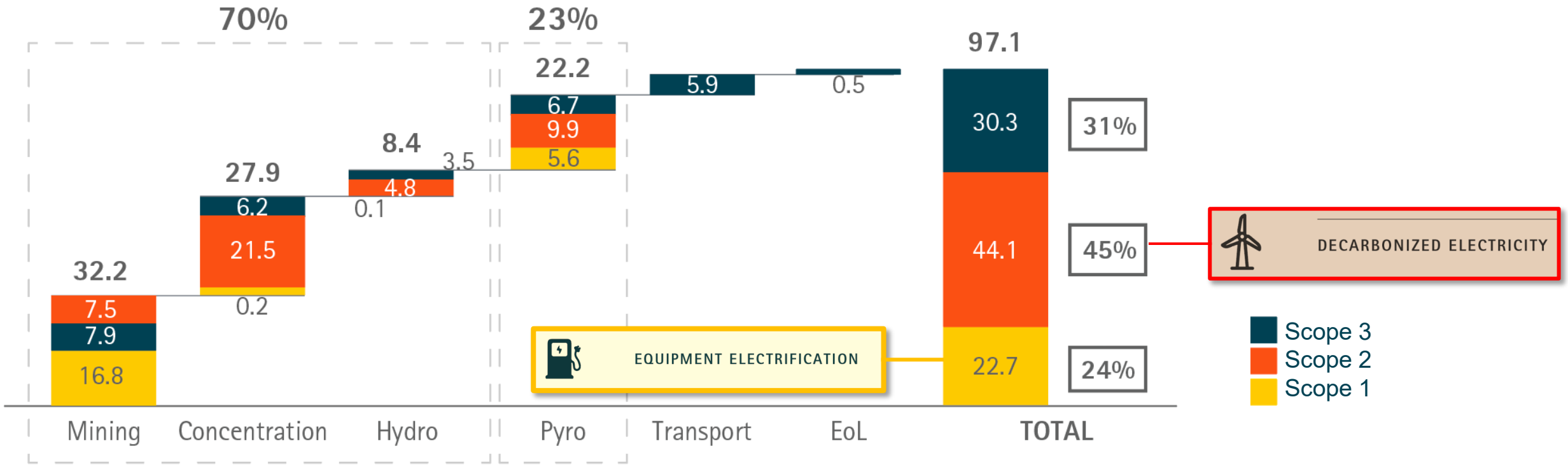
Policies requiring more durable products, longer lifetimes


Ok.
Then, what kind of specification is more adapted?

Mined copper is on its way to decarbonisation

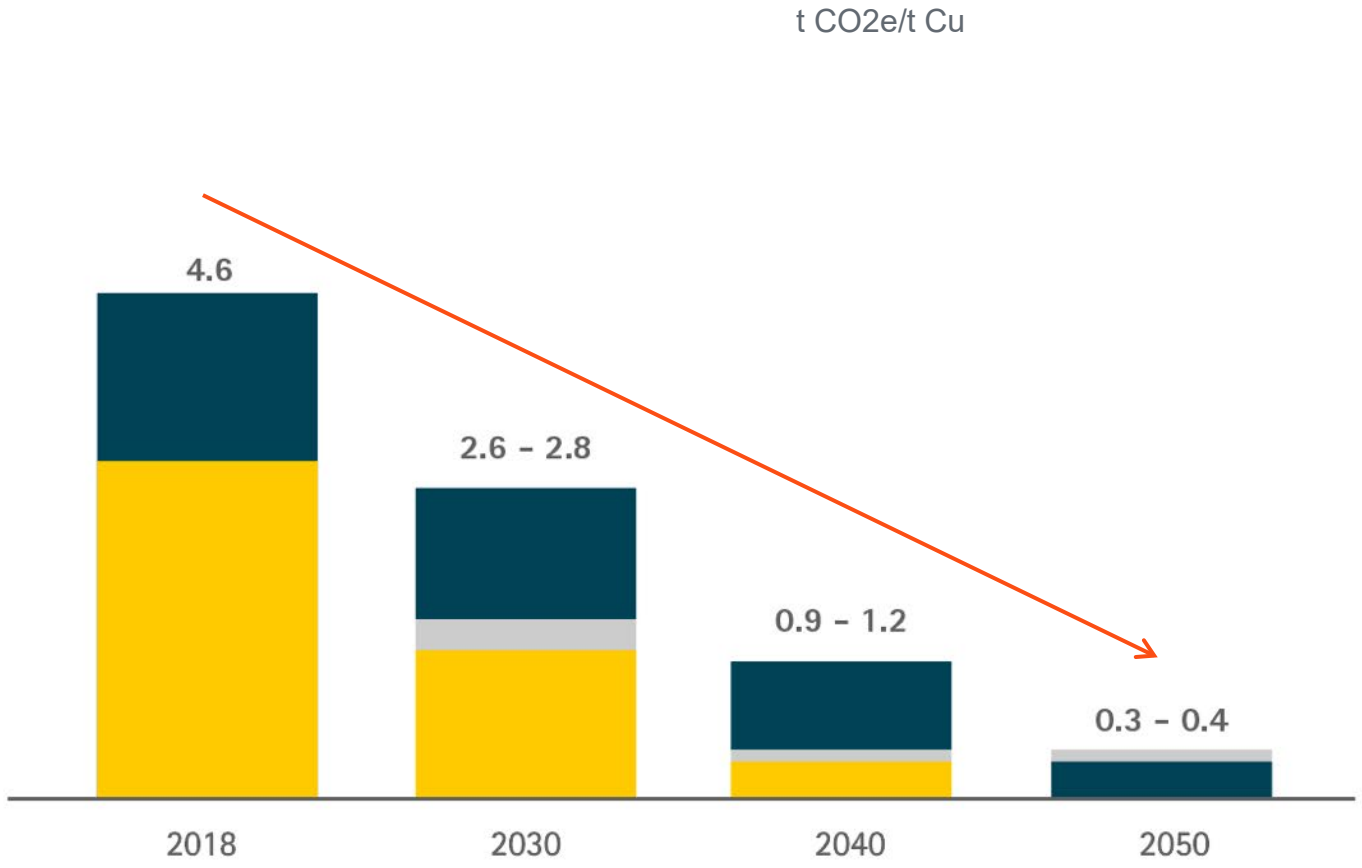
	Examples
DECARBONIZED ELECTRICITY	Decarbonized electricity supply or on-site generation
ALTERNATIVE FUELS	Hydrotreated vegetable oil e-fuels Hydrogen
EQUIPMENT ELECTRIFICATION	Battery-driven haulage trucks Electric drills In-pit crushing and conveying
EFFICIENCY GAINS	Higher efficiency grinding media for mills Higher efficiency in smelting, leaching, ...

2018 global carbon footprint, million tonnes CO2eq



https://internationalcopper.org/resource/copper-pathway-to-net-zero/

Carbon intensity of refined copper has the potential to drop to almost zero by 2050



This trajectory assumes scenarios for key enabling conditions such as the availability of clean electricity and technologies

This is a worldwide collective average trajectory based on potential and is not applicable on individual members

Includes increased recycling

Scope 1 and 2

Scope 3

https://internationalcopper.org/resource/copper-pathway-to-net-zero/

Takeaway

Sustainability requirements are more robust in the mid and long-term when considering **also** primary copper sourcing together with pathways for its decarbonisation

In short…

EU copper supply is secure and diversified

Copper has the lowest supply risk among key raw materials

The Critical Raw Materials Act further supports copper projects in Europe

There is enough copper in the earth and on the ground to cope with demand, but conditions need to be met to make it ready in a timely manner

Both recycled copper and mined copper are needed to supply the total demand

Mined copper is on its way to decarbonisation

Cu

International Copper Association Europe

Thank you!

fernando.nuno@internationalcopper.org