Copper Substitution Survey 2022

Krisztina Kalman-Schueler
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**Price:** Competitors should not discuss future prices (including terms of sale) of their products. There is no blanket prohibition against the mention of or reference to current or past prices but limits must be observed.

**Competitive Information:** Competitors should not discuss the market share of a particular copper producer or copper fabricator’s products.

**New Products:** Competitors should not encourage or discourage the introduction of a new product by another competitor or reveal a particular copper company’s plans to change the production rate of an existing product or to introduce a new product.

**The Role of Legal Counsel:** Legal counsel attends association meetings to advise association staff and other meeting attendees regarding the antitrust laws and to see that none of the matters discussed or materials distributed raise even the appearance of antitrust improprieties.
Executive Summary

Copper Use

Copper use has recovered in 2021 with green drivers increasingly dominating growth.

Many copper-intensive sectors like infrastructure, manufacturing or residential construction still benefit from the Covid19 recovery packages.

The combination of strong demand and supply disruptions lead to increasing copper material costs in 2021.

As end uses recovered and OEMs started to respond to increasing demand restocking in the supply chain intensified. Increasing copper material costs and shipping disruptions drove OEMs to restock more than their immediate semis requirements leading to supply shortages on the semi finished products level.

Large majority of the fast-growing copper applications are strongly impacted by green drivers such as electrification, e-mobility, energy efficiency and high-tech.

Substitution

Copper substitution increased in 2021 on the back of the rising copper material costs. Still net copper substitution remained at a low 1.32% of copper use in 2021.

The main driver of substitution was not the copper-aluminium cost ratio but the absolute difference between the copper and aluminium costs.

Applications which experienced limited substitution are power cables, industrial tubes, many non-electrical plates sheet strips and foils (PSSF), winding wires in transformers and some non-critical alloy applications.

Many large copper applications like electrical PSSF, building wires, equipment wires have very limited potential for substitution.

Furthermore, winding wires in electrical motors experienced gains due to higher energy efficiency requirements.
Examples Of **Major Companies Included In the Interviews And Surveys**

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<tr>
<th>Fabricators</th>
<th>Cable and wire producers</th>
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<td>SUNDWIGER Messingwerk</td>
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<td>HAILIANG</td>
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<tr>
<th>End users, Trade assoc., Distributors, Experts</th>
<th>OEMs, R&amp;D</th>
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<tr>
<td>Bowers</td>
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<td>SUNTECH</td>
<td>Schneider Electric</td>
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2021 was an unusual recovery year

**Manufacturing strong**
Manufacturing has recovered in 2021 after the disruptions of 2020. A gradual softening of manufacturing is expected from 2022 onwards as rising inflation and economic instability will bite.

**Automotive weak**
The shortage of semiconductors and chips is severe with negative impact on the automotive deliveries. The global chip shortage is now set to last into 2023 with an impact on automotive sales well into 2024.

**Construction strong**
Global construction market activity seemed positive in 2021 especially residential construction is predicted to drive short-term recovery. However, economies are recovering in different ways with China suffering due to the Evergrande scandal while USA and ASEAN showed strong recovery.

**Infrastructure developments strong**
Infrastructure developments drove medium term recovery as these were set up within the Covid 19 fiscal recovery plans. Grid expansion, transport, telecommunication network updates and building the EV charging infrastructure all require copper.

**China still strong and leading recovery**
China remarkably recovered after the Covid19 pandemic and is functioning at or close to pre-pandemic levels already. The world’s largest market for copper continues leading the recovery of copper use in the future.

**Supply chain issues & shipping**
Serious availability issues from supply chain disruption at mills together with skyrocketing shipping costs lead to limited availability of certain copper semifinished products.

Some OEMs have tripled their delivery time and at least 1-2 years are expected for stabilizing production and delivery times.
Applications impacted by green drivers are fast growing

Future Market Growth Rate CAGR 2021-26

Fast Growing Markets
Large majority of the fast-growing copper applications are "green"

Impact of green drivers on copper use
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- ++

Market size 2021 in kt

Small Market
Future Market
Large Markets

Future Market Growth Rate CAGR 2021-26

Large Markups

Future Market Growth Rate CAGR 2021-26

Large Markups

Future Market Growth Rate CAGR 2021-26

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Future Market Growth Rate CAGR 2021-26

Large Markups
Copper use will continue to increase as new green demand drivers will have an increasing impact.
Copper Substitution increased in 2021...

2021: Net Substitution as **1.32%** of Copper Use

2022-26: Net Substitution is expected to further increase in 2022 before stabilizing after 2023
... but still stands at just **1.32%** of copper use in 2021

2021: Net Substitution as **1.32 %** of Copper Use
Power Cables, Alloys and Tubes contributed to an increased substitution

Although small tonnages, the largest relative contributor to substitution are Alloys, Power Cables and Winding wires in Transformers.
Drivers and Inhibitors of Substitution

- Relative and absolute material costs
- Weight
- Theft
- Copper Conductivity / Space Performance
- Energy Efficiency Requirements
- Building and fire safety standards
- High corrosion, friction and fire resistance of copper alloys
Declining **Copper-Aluminium Price Ratio** does not match increase of net substitution

Prices used: Monthly average LME Copper and Aluminium Cash-Settlement Price, Price of Steel Rebar according to Trading Economics

**Price Ratios (Cu-Al, Cu-Steel Rebar) and Net Substitution - in kt**
For OEMs the **absolute copper-aluminium price difference** matters and this widened in 2021

Prices used: Monthly average LME Copper and Aluminium Cash-Settlement Price.
Copper Products with the Largest Markets Experienced Low Net Substitution in 2021

Growing markets and relatively low net substitution
Thank you very much for your attention.