

Global Copper Substitution and Regulatory Trends

Research Conducted by: MetalsPlus Research and Consulting

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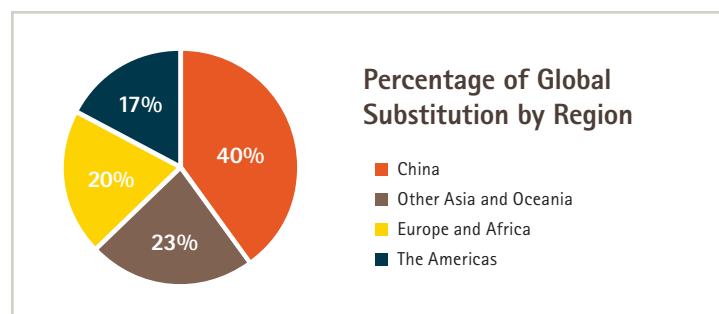
The International Copper Association (ICA) commissioned MetalsPlus Research and Consulting to analyze the risk of substitution across copper's many applications worldwide. The study also provided a preliminary examination into the impact that regulatory issues could have on the copper market.

Key Findings

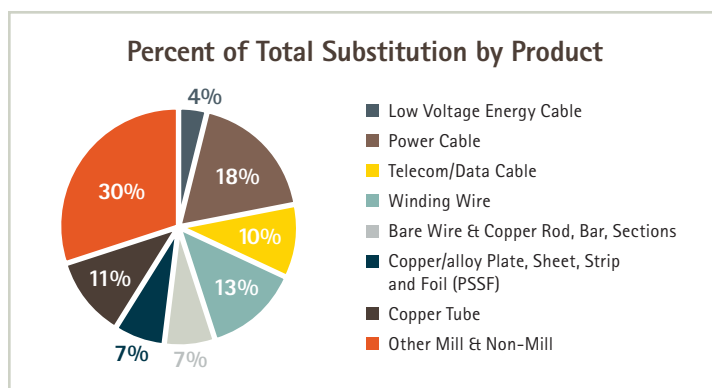
- Net copper substitution losses declined from 1.1% in 2015 to 0.9% of the market in 2016.
- Substitution losses are trending favorably for copper, having declined for five consecutive years.
- Copper experienced increases in substitution gains totaling 85 kilotonnes (kt) in 2016.
- Regulations are becoming more stringent, which could result in both material substitution gains and losses for copper through 2025.

Global Analysis of Substitution

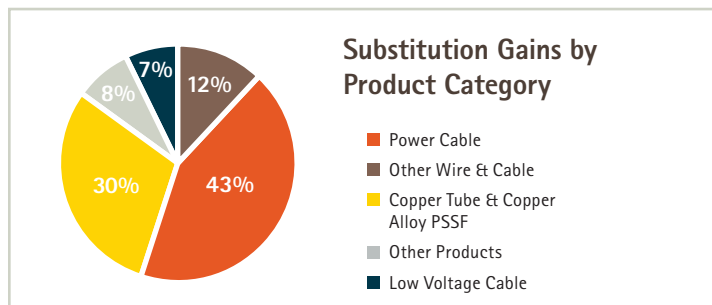
The study showed that substitution varied by geographic region, as shown in the breakdown below. Of the 240 kt of copper substituted globally, China accounted for the greatest percentage, due to the fact that it accounts for the largest usage of copper in the world. Following is a detailed breakout of regional substitution.



Every product category examined in the report showed declines in material substitution during 2016. The following chart shows each category and the total percentage of net substitution it represents.



The MetalsPlus research detailed copper's substitution gains by application in 2016 and found increases within the following product categories.



Regulatory Impact

The global impact of regulations could play a much more important role in copper and its end-use markets in the future. Preliminary findings from the study showed that the following areas related to energy efficient equipment and the reduction of greenhouse gases are expected to have a stronger positive impact for copper:

- Minimum efficiency performance standards (MEPS) for motors and transformers.
- Renewable energy systems.
- Automobiles.

For additional information about copper or the International Copper Association, please visit www.copperalliance.org or www.sustainablecopper.org.

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