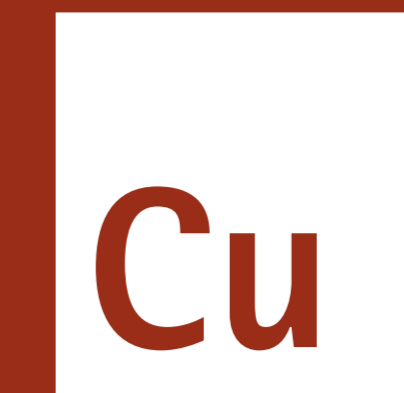


The Potential of Iron Silicate in the Construction Sector

Ladji Tikana, Aurelio Braconi, Wendy Wellens, Symeon Christofyllidis
International Copper Association



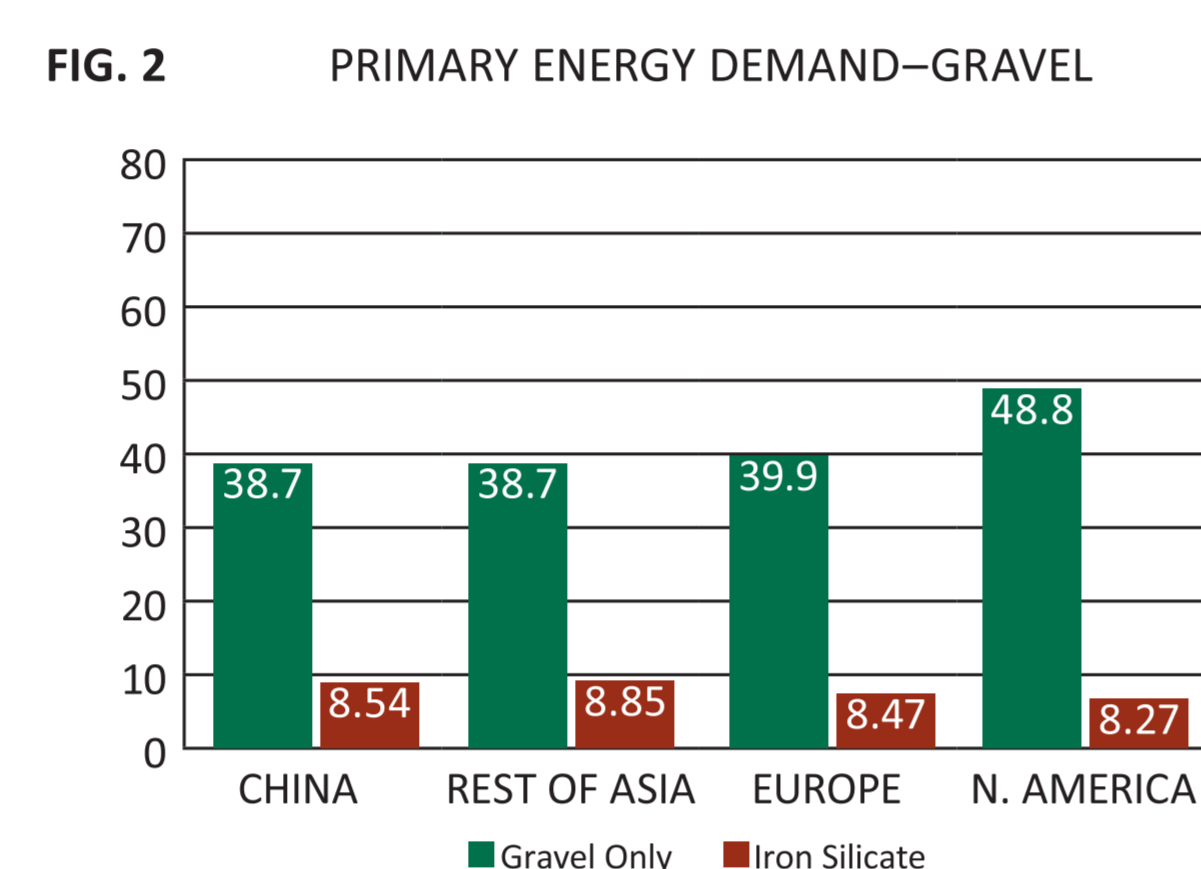
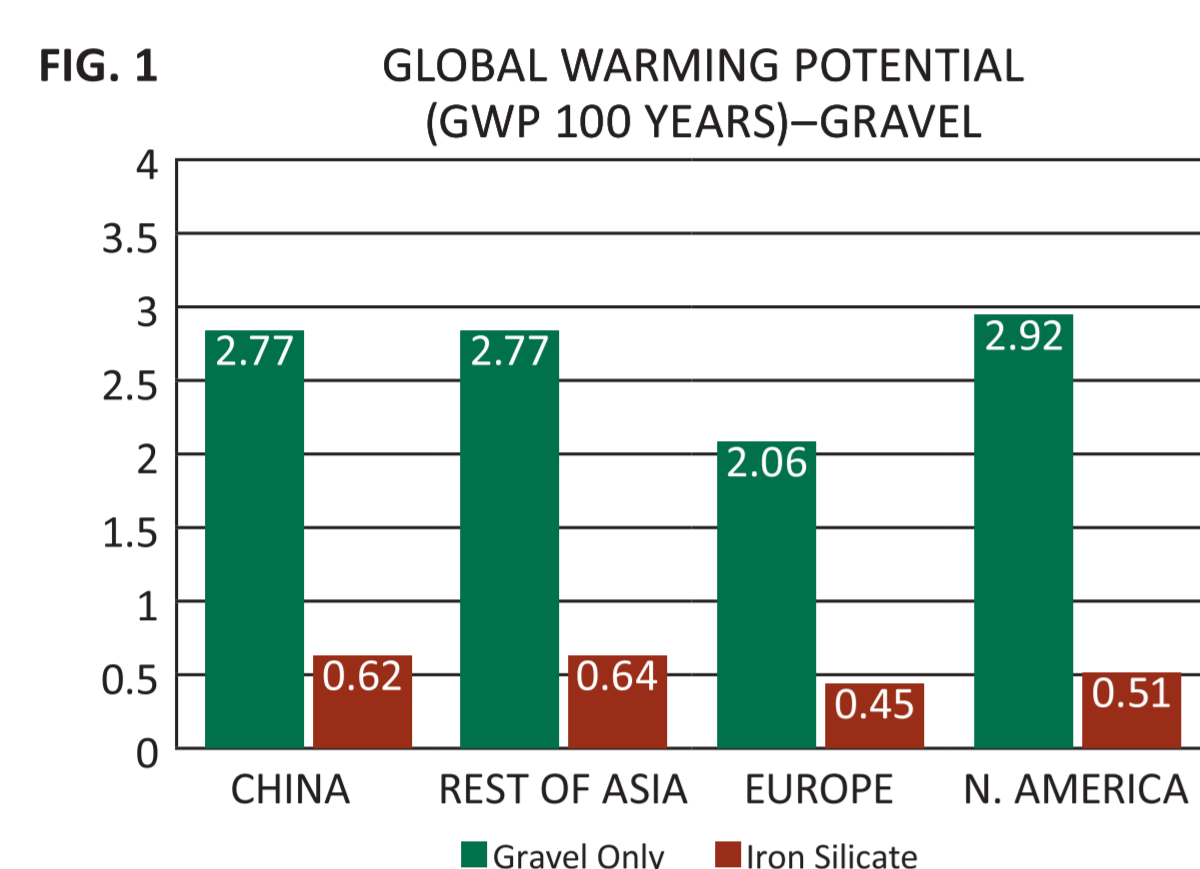
International Copper Association
Copper Alliance

IRON SILICATE is an industrial mineral, purposefully produced during the refining and recycling processes of copper. It has gone through the necessary testing to confirm that it can constitute a safe and sustainable substitute of choice for virgin raw materials in the construction sector (e.g., gravel and stones for concrete). Its use via industrial symbiosis can bring about significant environmental and economic benefits.

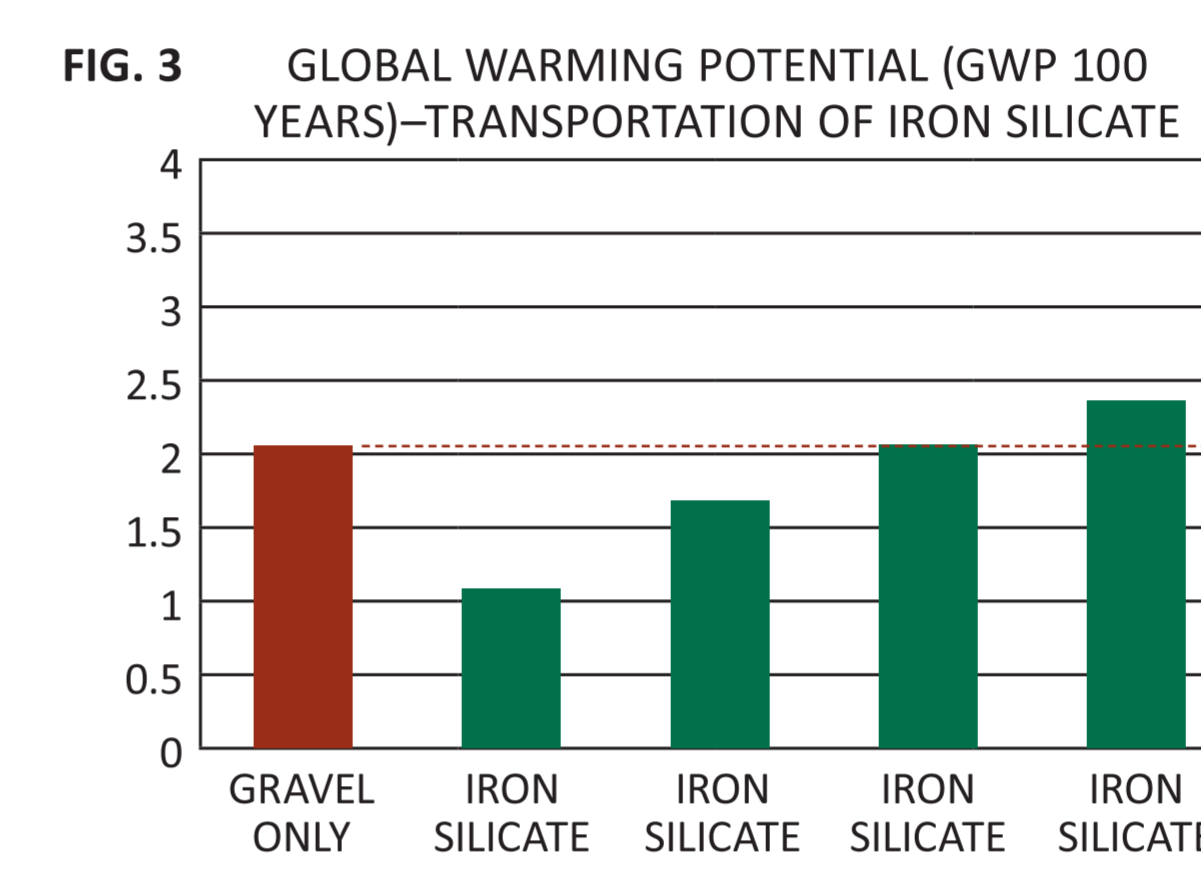
ENVIRONMENTAL BENEFITS

Gravel

The global warming (Figure 1) and primary energy demand impacts (Figure 2) associated with iron silicate production are less than half the impacts associated with gravel production – excl. transport.

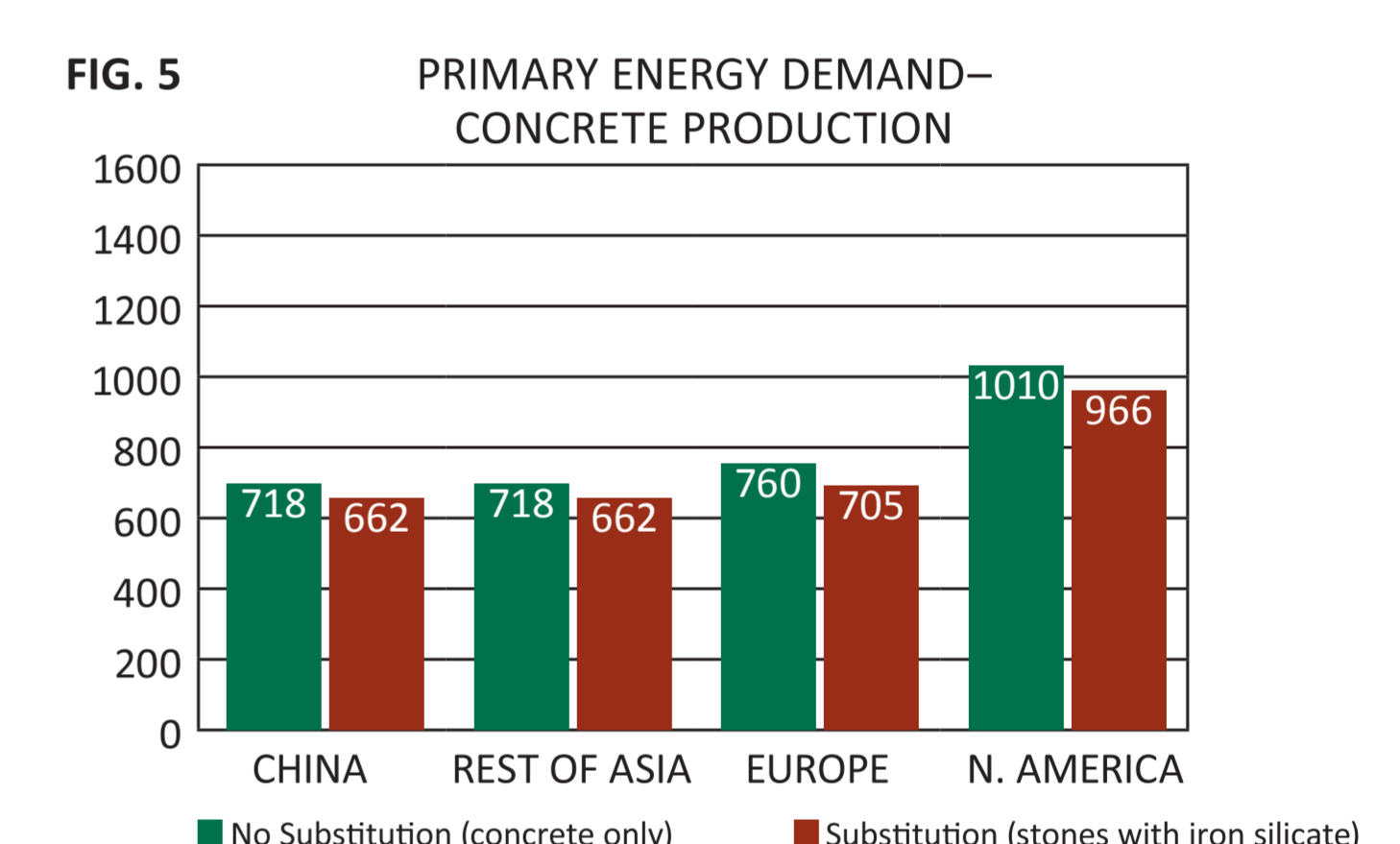
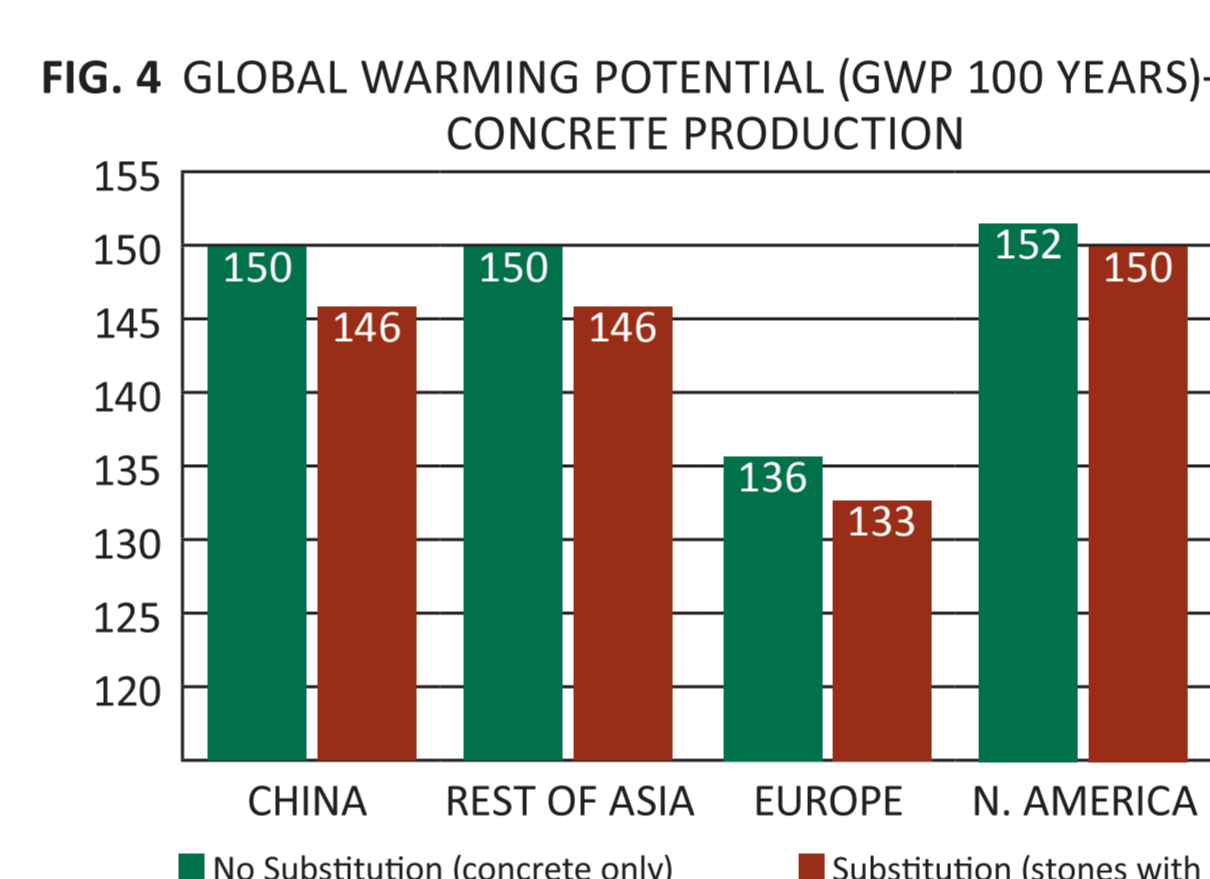


The substitution of gravel with iron silicate results in less GWP impacts if the iron silicate is transported to distances less than 26km (compared to the baseline) (Figure 3).



Concrete

The global warming impacts associated with the production of concrete decreased by at most 3 percent when iron silicate is used to substitute the stones in concrete production (Figure 4). Respectively, primary energy demand impacts associated with the production of concrete decrease by at most 8 percent when iron silicate is used (Figure 5).



ECONOMIC BENEFITS

Demand for natural aggregates in construction in Europe:

In 2018, the demand for natural aggregates in Europe was around 3bn tons and is expected to grow to 3.2bn tons in 2025 (+351,917kt vs. 2022).

Supply of iron silicate in Europe:

By 2025, the supply of iron silicate in Europe will reach 6,390kt.

Opportunity for Cu Producers:

The amount of iron silicate generated in Europe will be able to substitute, or offset, natural aggregates in a manner that will not significantly nor durably affect the aggregates industry or cause disruptions in the market (e.g., job loss).

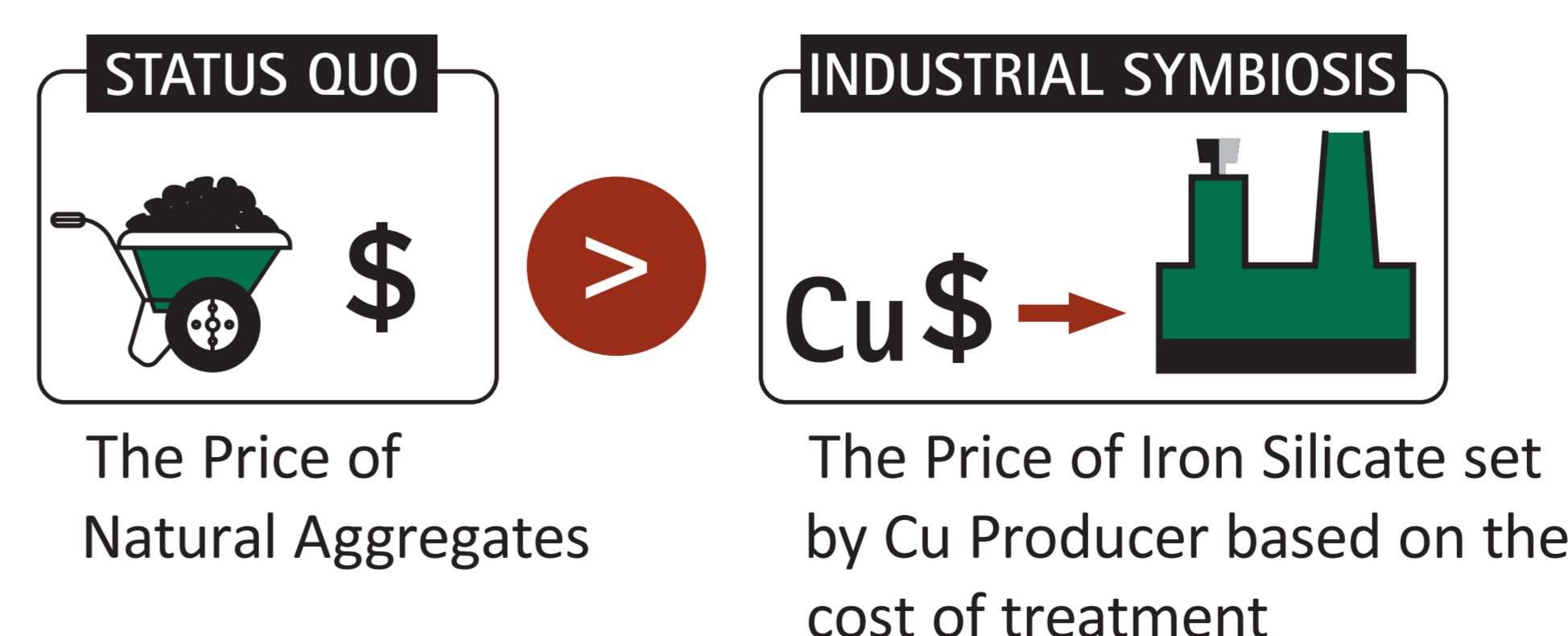
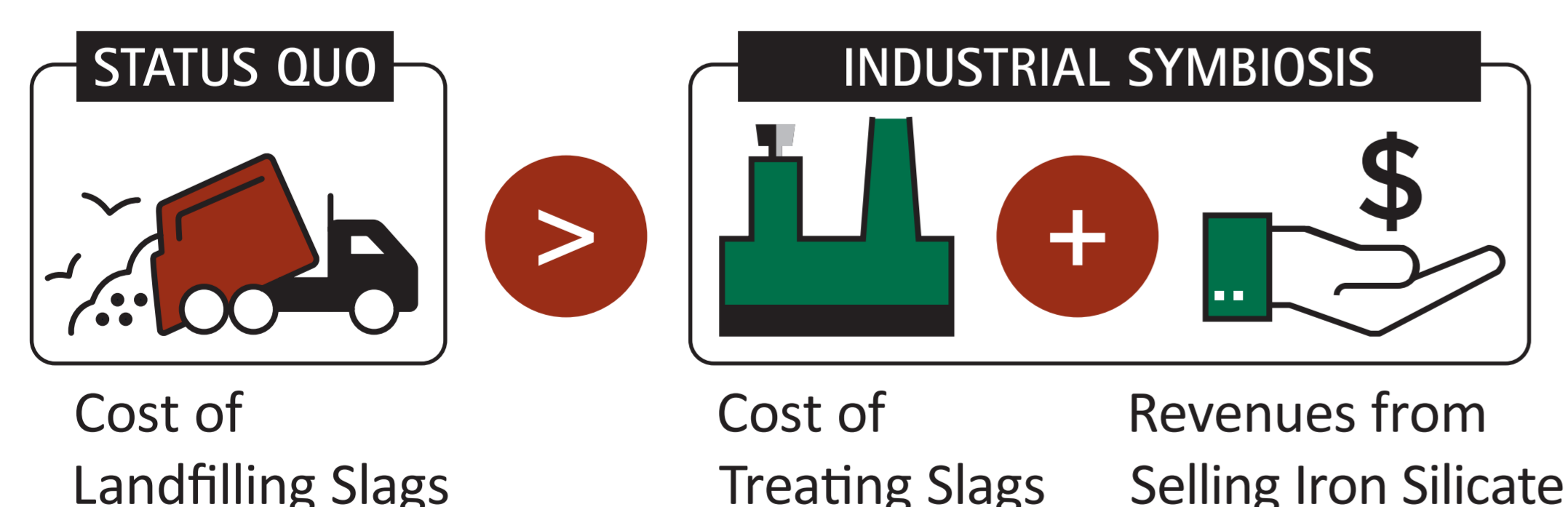
Cost-Benefit Analysis for the Iron Silicate Case:

Copper Producer Perspective

- 1 Landfilling costs are company-specific.
- 2 Landfilling costs and taxes vary greatly from region to region (in EU can be 80+ €/ton).
- 3 Slags treatment costs are company-specific.
- 4 Costs for landfilling are on the rise.

Natural Aggregate User Perspective

- 1 Natural aggregates costs are region-specific, and depend on the quality.
- 2 Natural aggregates costs are rising in Europe.



With landfilling costs and natural aggregate production costs being on the rise, substitute materials such as iron silicate are favored. In any case, a detailed market size estimation and cost-benefit analysis on a company-by-company basis are necessary to conclude on the Industrial Symbiosis feasibility.

Tackling future critical challenges
18-20 April 2023 Mechelen, Belgium