

## Towards circular flows of tungsten - Characterizing dissipation

## **OUR RESEARCH**

Cemented carbide constitute more than 50% of the global tungsten consumption and is mainly used in applications were high hardness and toughness are required. The considerable dissipation of cemented carbide is a hindrance for circular material flows of tungsten. It is recognized that tungsten dissipates through flows to landfill, emissions to the environment, and dilution in other material flows. However, their relative shares have remained unknown. The aim of this study is to characterize the dissipation from cemented carbide applications in the Dissipation use phase, with the aid of substance flow analysis (SFA). Preliminary results are shown in the figure below. Landfill 0 kton Mining and kton construction 13 kton **Emissions** E.g. Conical pick 4 - 13 kton Metal cutting Global flow of 11 kton Dilution cemented carbide E.g. Cutting insert 24 - 33 kton ~ 2012 Wear applications 49 kton Wood/plastic working Chipless forming Many different 0 - 25 products 25 kton 0 - 25 E.g. Circular saw Recycling blade 12 kton

## **RESULTS SO FAR**

- Dissipation is dominating over recycling by about a factor of three
- Dilution constitutes the largest share of the dissipation (>60%)
- Data on flows for the use phase and recycling are scarce