

# MSWI SLAG IN A CIRCULAR ECONOMY: METAL RECOVERY AND RESOURCE QUALITY

**Stefanie HELLWEG, Melanie HAUPT, Carl VADENBO**

Institute of Environmental Engineering, ETH Zurich, HPZ E 31.2, John-von-Neumann-Weg 9, 8093 Zurich, Switzerland

*hellweg@ifu.baug.ethz.ch*

## **Abstract**

Technologies to recover metals from incineration residues often save net energy by enabling the substitution of primary metals with the secondary resources recovered. The environmental performance of recycling of metals recovered from MSWI slag, however, is heavily influenced by the quality of the scrap. The presence of minerals, unwanted elements and large non-conductive pieces that stick to the scrap lead to a low yield and may increase the energy demand in the melting process. A statistical analysis of industrial data from an electric arc furnace showed a strong correlation between the electricity demand in steel recycling and the scrap quality used. The lowest quality in terms of composition (highest copper and tin concentrations) and the highest electricity demand (40% higher electricity demand than average scrap grades) were found for scrap recovered from MSWI slag. While even in view of these results the benefits of steel recycling compared to primary metal production remain undisputed, these findings raise the discussion of a need for further pre-treatment of MSWI scrap prior to the melting process, to improve the environmental performance and assure long-term quality of secondary products. We suggest to pay attention to the manner of how material recycling is performed in the Circular Economy, in addition to increasing the recycling rates.