

## Electrification of the Recycling Route for Aluminium

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### Abstract

The presentation "Electrification of the Recycling Route for Aluminium" shows induction-heated solutions for the melting process and resistance heaters for the heat treatment process. By using electricity from renewable energies, this makes an important contribution to the decarbonisation of aluminium production.

One option is the combination of external pyrolysis of scrap containing organic material in a rotary kiln and a downstream melting process in a crucible induction furnace. This makes it possible to achieve a high metal yield with low CO<sub>2</sub> emissions.

Existing gas-fired chamber melting furnaces can be electrified through the development of the so-called "Liquid Metal Flow Heater". An electromagnetic pump conveys the molten metal from the furnace chamber into a crucible inductor for overheating and then back into the existing melting furnace. In this arrangement, hybrid heating using green electricity or natural gas is possible. In addition, the melting capacity of the furnace can be increased by using both heating systems at the same time. When using material with organic components, pyrolysis in the rotary furnace can be installed upstream of the melting furnace.

The development of electric resistance heating systems with high power density makes it possible to replace natural gas burners in existing and newly developed heat treatment systems so that they can be fully electrified. When using a power-to-heat system in conjunction with a ceramic heat storage unit, low-price phases in the electricity grid can be utilized by converting electrical energy into heat.