HighEFF

Case Study, Metals and Materials Sector

Pre-heating of anodes in production of primary aluminium

Possible change in operation of aluminium electrolysis cells

Currently, new anodes are inserted into the cell at room temperature, while spent anodes are removed and allowed to cool down. Newly inserted anodes will not produce metal before they reach an adequate temperature, consuming energy from the cell. New anodes have in this study been pre-heated using spent anode material in an industrial setting.

1 %

Increased current efficiency, corresponding to 0.15 kWh/kg-Al

0.2 %

Achieved reduced energy consumption, corresponding to 0.02 kWh/kg-Al

7.8 TWh

Potential global energy savings per year, not including productivity increase

Increased productivity is based on literature data (Fortini et al., Light Metals 2012, pp. 595-600) achieved over a longer operating period. Achieved reduced energy consumption is based upon successful heating to 150°C using spent butts, while the global potential of 7.8 TWh requires heating up to 960°C, assuming an average energy consumption of 12 kWh/kg-Al and 65000 metric tonnes produced.

CENTRE FOR ENVIRONMENT-FRIENDLY ENERGY RESEARCH

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