

Net-zero Emissions from Primary Aluminium Production - Is it Technically and Economically Possible by 2050?

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Abstract

Reducing greenhouse gas emissions and combating climate change have become a priority for nations and businesses, and that includes the aluminium industry. 2050 has been chosen as the target year when the global primary aluminium industry will have reached net-zero greenhouse gas emissions. There is a clear path to decarbonisation for the aluminium industry, and many aluminium producers have now developed their own low-carbon roadmaps. However, reaching the goal of net-zero emissions will require significant decarbonisation of the electric energy mix, the alumina and anode supply chains, the aluminium electrolysis process, and also the downstream recycling. Is it technologically and economically possible for the global aluminium industry to reach net-zero, and which new technologies are required to achieve this? The present paper gives a summary and discussion of the main processes that have been suggested in the open literature to reach net-zero emissions from the primary aluminium industry.

Keywords: Primary aluminium production, Greenhouse gas emissions, Decarbonisation, Net-zero emissions.