Life Cycle Assessment (LCA) of the Refined Ferromanganese Alloy Production

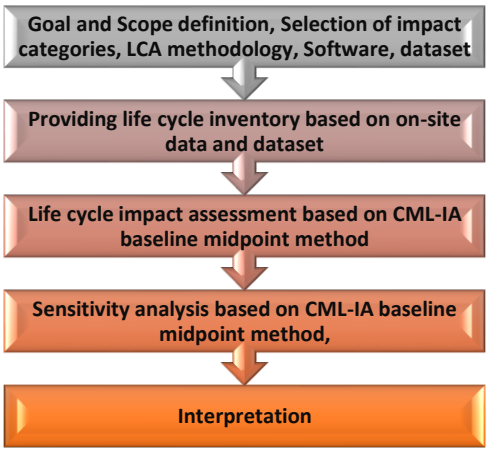
Master's thesis number: FMH606

Introduction and background:

Nowadays, climate change caused by anthropogenic CO_2 emissions is considered one of the most prominent issues. The annual CO_2 emissions to produce ferroalloys add up to 87 million tonnes globally. Direct emissions are most of these emissions created in the smelting furnace, e.g., blast, electric arc, and submerged arc furnaces. The indirect emissions originate from coal dust, ore mining, metallurgical coke, and power production. Life cycle assessment (LCA) is a method to evaluate the environmental impact of products, processes, or activities during their part or entire life cycle. Environmental issues considering the primary contaminative processes and pollutant sources can be documented using LCA. LCA can be helpful for decision-makers to determine improvement measures to reduce environmental emissions e.g., from industrial production processes.

Problem description and objective:

Eramet Norway, Porsgrunn is a well-known company producing different ferromanganese alloys in a wide range of qualities, and it has a high focus on reducing their environmental effects. This study aims to establish a gate-to-gate LCA of Refined Ferromanganese alloy produced by this company. Three main environmental impact categories are selected to consider the processes; Global Warming Potential (GWP), Acidification Potential (AP), and Photochemical Ozone Creation Potential (POCP). In addition, sensitivity analysis are performed to consider how different electricity mixes with varying consumption amounts might affect the environmental impact of the production.



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