

Carbon Footprint - Calculation for Aluminum Production Processes

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Abstract

The achievement of climate targets and the necessary transition of the energy market are creating increasing challenges in the sectors of energy-intensive industries. In order to take into account all specific factors and determine comprehensible comparative values of clearly defined product systems and system boundaries, the methodical determination of the CO₂ footprint of products is becoming increasingly important on the part of industry, e.g., by applying the standards DIN EN ISO 14067 and 14064 or the Greenhouse Gas Protocol Standard. The CO₂ footprint is determined on the basis of life cycle assessments (LCA), usually in accordance with the international standards DIN EN ISO 14040 and 14044. This includes detailed recording of production data, supply chains and the associated CO₂ emissions, and the main material and energy flows.

Plant engineering is of particular importance for the implementation of the energy transition, as it is obliged to develop and provide the technological solutions for the decarbonization of industrial process heat. This not only concerns the technical feasibility, but also the evaluation of the ecological and economic advantages of a technology, which can only take place in the overall context of the applicable regulations and frameworks and must be evaluated site-specifically.

For investment decisions and the assessment of entrepreneurial risk, a quantification of future options in the context of regulations and framework conditions in comparison with the current situation is essential.

For this purpose, the methodical evaluation of the product specific CO₂ footprint enables plant engineering, especially SMEs, to analyze and evaluate its technologies site-specifically with regard to the CO₂ footprint in order to develop targeted solutions. The determination of the specific CO₂ footprint thus plays a key role.

In this presentation, the fundamentals of product carbon footprint calculations are explained, also covering the applicable norms and regulations. Furthermore, different calculation software and database solutions are introduced. The outlined principles are then illustrated by exemplary analysis of a typical aluminum reheating process facility.