ENERGETICS

MUR DM 117/Cogne Acciai - Optimization of energy consumption and carbon footprint of industrial processes for automotive steel components

Funded By	COGNE ACCIAI SPECIALI S.P.A. [P.iva/CF:00571320076] MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] Politecnico di TORINO [P.iva/CF:00518460019]

Supervisor	SPESSA EZIO - ezio.spessa@polito.it

Contact	MISUL ALESSANDRO

Context of the research activity	Carbon footprint estimation of tier 1 and/or tier N emissions coming from steel/metal semi-finished products used by automotive components. Progetto finanziato nell'ambito del PNRR - DM 117/2023 - CUP E14D23001950004

Objectives	To pave the way towards a climate-neutral mobility, the European Commission has recently identified the need for a new methodology for the assessment and the consistent data reporting of the full life-cycle CO2 emissions of light- duty vehicles that are placed on the Union market ([1]). For this reason, consensual guidance for a consistent determination of vehicle LCAs is of paramount importance. To make the best / most informed choices in terms of sustainability and considering the many challenges still ahead, it is of upmost importance to have the right tools to assess technologies and product life-cycle processes in a holistic way and as a continuously monitored development target. However, up to 70% of GHG emissions from automotive companies are indirect emissions (also called 'value-chain' or Scope 3 emissions), that can derive for instance from waste disposal or incineration, extraction of raw materials used in manufacturing, manufacturing of products used by the company as well as from downstream usage of products or services. These emissions are more challenging to detect, record and report, but they are a vital component toward reaching net-zero targets in the future. This project aims at identifying tier 1 and/or tier N emissions coming from steel/metal semi-finished products used by automotive components, contributing to the decarbonization process through the awareness of their impacts related to their production. The first goal is to fill the lack of a common

shareable dataset, characterization factors and consequent impacts of materials and elements belonging to metal/steel macro-sector. The second objective is to increase knowledge on automotive metal semi-finished products by considering optimization to reduce CO2 emissions and improve environmental performance at the production site, taking the impact of recyclability into account. Finally, the project will realize a flexible LCA model capable to be applied to processes and technologies that improve and evolve over the time, and that can be used to optimize the carbon footprint of the metal production plants and to assess the economic and environmental impact of different optimization scenarios on the car system design.

The goals and activities are in line with Italian PNRR mission 4 "Istruzione e ricerca" – Componente 2 "Dalla ricerca all'impresa", with specific reference to decarbonization and improvement of circular economy in hard-to-abate sectors, to achieve closed-loop, sustainable, inclusive factories and processes.

References

[1] 2021/0197 (COD) PE-CONS 66/22 of the European Parliament and The Council, Feb, 22nd 2023.

Skills and competencies for the development of the activity	Technical competences about: pollutant and GHG emissions from the energy and automotive sector. Fundamental knowledge about Life-Cycle Assessment approaches. Good knowledge of programming and simulation tools (MatLab, Simulink)