

CHEMICAL ENGINEERING

MUR DM 117/Stellantis - Analysis of green and critical raw materials for automotive components

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Context of the research activity	<p>The ecological transition is one of the major challenges of our time because it boosts the shift from a heavy fuel-reliant economy to a circular and sustainable one.</p> <p>One of the most important pillars of the ecological transition concerned the achievement of net zero carbon emission and consequently the necessity of decarbonising the industrial processes.</p> <p>The car sector is participating in the decarbonization process by re-thinking the structure of cars and vehicles considering the technical feasibility and environmental sustainability.</p> <p>Specifically, the attention is focused on the evaluation of the environmental impacts of the critical raw materials and plastic, which are employed in the car structure.</p> <p>The current problem related to the quantification of the environmental impacts of these materials (CRM and plastics) is the lack of a common shareable dataset and characterization factor.</p> <p>Moreover, to minimize the environmental problems related to plastic adoption in-car systems, it is mandatory to evaluate the possible adoption of alternative and renewable plastic like bioplastic. To evaluate the improvement of the transition from fossil-based plastic to renewable bioplastic, it is mandatory the realization of an ad hoc ecodesign study about bio-plastic components by considering the function of the bioplastic in the automotive sector and trying to identify solutions to minimize the emission through the correct selection of raw material, energy efficiency of the process, and waste minimization.</p> <p>Progetto finanziato nell'ambito del PNRR – DM 117/2023 - CUP E14D23001980004</p>
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	<p>The objectives of this PhD are:</p> <ul style="list-style-type: none">• The identification of alternative and renewable bioplastics to adopt to
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Objectives

- replace the traditional fossil-based plastic in the car structure.
- The evaluation of the technical feasibility of this bioplastic in the car structure.
- The evaluation of the current environmental impacts related to bioplastic and critical raw material used in the car system.
- The development of a Life Cycle Assessment about plastic and critical raw materials of at least 4 car system structures.
- The improvement of the current environmental impact by developing an ecodesign which could consider the 6R: Rethink, Refuse, Reduce, Reuse, Recycle, Repair.
- The evaluation of the increase and diversification of the EU's critical raw materials supply chain.
- The reinforcement of the circularity in CRM field, including recycling.
- The support of the research and innovation on resource efficiency and the development of substitutes.

Skills and competencies for the development of the activity

- Knowledge in Life Cycle Assessment (LCA) and Life Cycle Thinking (LCT) methodology, cause-effect environmental mechanisms, process design, material engineering.
 - Pro-active orientation and commitment to innovation
- In addition, the candidate could bring:
- Knowledge in chemical engineering
 - Previous experience in LCA studies
 - Comfort/experience with quantitative analysis or modelling
 - Strong communication and time-management skills to drive quality results
 - Ability to interact and collaborate in a multi-disciplinary environment.