ENERGETICS

IN Srl - Solar-Driven CO2 Conversion to Bio-Based Chemicals through Compartmentalized Photosynthetic Biomanufacturing

Funded By	IN Srl [P.iva/CF:02521710307]
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Context of the research activity	The DENERG Department of Politecnico di Torino conducts interdisciplinary research supporting the decarbonisation of the EU economy and the energy transition. The shift toward a sustainable and circular bioeconomy requires low-impact routes for producing bio-based chemicals. Photosynthetic microorganisms offer strong potential but face efficiency and processing limits. The C5 project integrates synthetic biology, metabolic engineering and process design. This PhD will support energy system modelling and develop a harmonised LCA framework for the sector.
Objectives	The overarching objective of the PhD project is to contribute to the development of next-generation photosynthetic cell factories for sustainable chemical production. Specifically, the PhD research will aim at supporting the cyanobacterial CO2 fixation by optimize the process and evaluate the environmental and economic performance of the developed system through Life Cycle Assessment (LCA) and Techno-Economic Analysis (TEA), ensuring sustainability and industrial relevance. Overall, the research will contribute to defining effective strategies for reducing climate change impacts and promoting sustainable development, supporting a green recovery and helping to address the broader challenges posed by the climate crisis.
Skills and competencies for the development of the activity	The PhD candidate is expected to develop: • Competences on environmental LCA modelling. • Competences on energy modelling. • Competences on programming (e.g. Phyton). • Other relevant soft skills, such us: o Team working. o Autonomy at work. o Problem solving. o Communication skills. Basics of project management.