ENERGETICS

DENERG - Integrated Sustainability Assessment for direct solar fuel technologies

Funded By	Dipartimento DENERG
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Context of the research activity	The DENERG of the Politecnico di Torino is involved in many activities related to the decarbonisation of the transport sector. Among the others, the evaluation of the sustainability of alternative fuels for aviation and maritime is key. Due to the intearntional recongised expertise, POLITO I spartner of the SUN-PERFORM project. In the SUN-PERFORM project we will develop a novel bio-inspired route from solar energy towards fuel consisting of an in vitro artificial photosystems for improved light-harvesting, integrated with extensively engineered microalgae using, latest advances in synthetic biology, to improve carbon fixation. POLITO will support the partners by performing a full environmental impact of microalgae-derived fuels, particularly in terms of greenhouse gas emissions saving potential.
Objectives	The first objective of the PhD is the analysis of the proposed innovative sun-to-fuel production route. The PhD have to perform system energy modelling, including mass and energy balances. Another important objective of the PhD is to investigate the feasibility and techno-economic potential impact of using innovative solutions, contributing to the Techno Economic Assessment (TEA). Finally, the PhD will have to clearly quantify the potential environmental benefits of the proposed solutions, using LCA based open tools (OpenLCA and in-house tool). The research will contribute to the definition of actions to reduce the impacts of climate change and to the promotion of sustainable development, as a contribution to promoting green recovery and overcoming the effects of the climatic crisis.
Skills and competencies	The PhD candidate is expected to develop: • Competences on energy modelling. • Sustainability framework for biomass to energy vectors pathways. • Competencies on environmental LCA.

competencies for the development of the activity	• Other relevant soft skills, such us: o Team working. o Autonomy at work. o Problem solving. o Communication skills. o Basics of project management.