

## ICB PhD public presentations

# LIFE CYCLE SUSTAINABILITY ASSESSMENT OF LOW-CARBON PLATFORM CHEMICALS FOR ENERGY AND INDUSTRIAL APPLICATIONS

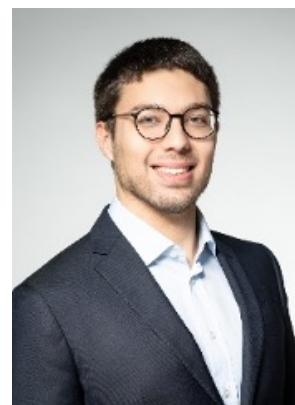
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ICB / Sustainable Process Systems

Engineering Lab

Supervisor: Prof. Dr. Gonzalo Guillén-Gosálbez

Co-examiners: Prof. Dr. Javier Pérez-Ramírez  
and Prof. Dr. Prodromos Daoutidis



**15/11/2023, 10.00 am**

**ETH Hönggerberg, HCP E 47.2 and on Zoom:**

**<https://ethz.zoom.us/j/69193029272>**

**Project Summary:** The rising effects of climate change call for effective carbon mitigation actions, as reflected in the Paris Agreement. Within this transition, the chemical and energy sectors will play a critical role due to their large fossil emissions. Specifically, these sectors rely on significant amounts of fossil-based feedstock for energy and chemicals production, resulting in high greenhouse gas emissions. Defossilizing platform chemicals, in particular, could drastically improve the sustainability level of the whole chemical value chain, which may require the integration with renewable power technologies.

In this talk, I will first motivate the need for an industrial green transition and elaborate on strategies where the chemical industry can play a pivotal role, focusing on the short- and long-term defossilization of platform chemicals. Then, I will focus on relevant case studies, highlighting potential trade-offs between economic and life cycle impacts when attempting to combat climate change. Finally, I will apply optimization-based frameworks in the multi-criteria sustainability assessment of a comprehensive set of production routes of platform chemicals that could be used for long-term energy storage, comparing them with other existing alternatives.

**CV.** Sebastiano graduated from Politecnico di Torino with a BSc in Chemical and Food Engineering in 2017. After a MSc in Chemical and Bioengineering at ETH Zürich, completed in 2019, in September of the same year he joined the group of Prof. Guillén-Gosálbez at the Institute of Chemical and Bioengineering as a PhD student.