

ICB PhD public presentations

SEASONAL ENERGY STORAGE WITH THE STEAM IRON PROCESS – FROM PROCESS TO BUSINESS CASE

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**ETH Hönggerberg, HCI H 8.1 and on Zoom
(<https://ethz.zoom.us/j/68378871075>)**



Project Summary: Fossil fuel consumption is a major source of greenhouse gas emissions, and rapid decarbonization of the energy sector is essential to achieve net-zero targets. Renewable electricity technologies, such as solar and wind, have emerged as cost-effective and carbon-neutral alternatives. However, these technologies face a critical limitation: their energy production depends on meteorological conditions rather than the current energy demand. This results in excess energy production during summer and insufficient supply in winter, creating a seasonal imbalance. To address this challenge, a cost-efficient and sustainable solution for seasonal energy storage is required.

The steam iron process, which is based on the reversible reduction of iron oxide with hydrogen, presents a suitable approach for seasonal storage. This presentation will focus on: i) the scaling up to a 10 MWh storage capacity and ii) the technology's potential role in future energy systems.

CV. Samuel obtained a BSc in chemical engineering and a MSc in process engineering from ETH. After working as data scientist for the ETH Spin-off dataHow and as biotechnologist at Lonza he joined the functional materials laboratory to pursue his doctoral studies.