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HåBiMet –Safe management of sustainable biocarbon for metallurgical use

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Background
The HåBiMet projects (HåBiMet is a Swedish abbreviation for Sustainable Biocarbon for Metallurgical use) originate from a fundamental question: Why is there still no large-scale market for metallurgical biocarbon? Despite its potential to enable fossil-free metal production and deliver significant climate benefits, biocarbon faces critical barriers to industrial adoption. Handling biocarbon introduces safety challenges such as mold growth, self-heating, and spontaneous ignition during storage and transport. These risks compromise material quality, occupational safety, and operational reliability, limiting its integration into metallurgical processes. HåBiMet is a group of projects addressing enablers and barriers for utilizing biocarbon in metallurgy from technical, social, and policy perspectives. This specific project focuses on safe management by reducing risks associated with mold formation and spontaneous combustion.
Objectives
The primary objective is to develop predictive models, guidelines, and best practices for the storage, transportation, and utilization of biocarbon in metallurgical applications. This includes generating knowledge through laboratory experiments, numerical simulations, and industrial trials to identify and minimize risk factors. Additional aims involve characterizing the properties and behavior of biocarbon briquettes to optimize production methods, ensuring mechanical stability and compliance with industry standards. The project also seeks to strengthen technical competence, improve workplace safety, and establish best practices that support sustainability across the supply chain. Furthermore, regulatory frameworks governing biocarbon storage and transport will be examined to ensure alignment with safety and environmental requirements.
Methodology
The research integrates controlled laboratory investigations –such as climate chamber testing, mold growth analysis, and isothermal calorimetry –with advanced computational modeling using CFD and DEM techniques. Full-scale industrial trials will validate laboratory findings and provide real-world data for model calibration. Risk and occupational safety assessments will complement technical analyses, ensuring that outcomes translate into practical and regulatory-compliant solutions.
Expected results and impact
The project is expected to deliver quantitative data on the interactions between moisture, temperature, and mold formation, as well as kinetic models describing self-heating and spontaneous ignition. These results will inform the development of guidelines and best practices for safe biocarbon handling. In addition, the project will produce recommendations for regulatory compliance and establish a knowledge-sharing platform to facilitate industry-wide adoption. By addressing critical safety challenges, HåBiMet will contribute to a sustainable and resilient biocarbon supply chain, supporting the metallurgical sector's transition to fossil-free production while enhancing operational safety and efficiency.

Speaker Country

Sweden

Speaker Company/University

Swerim AB

Primary author: Dr JARNERUD ÖRELL, Tova (Swerim AB)

Co-authors: NYLUND, Erland (Swerim AB); Mr DI FRANCESCO, William (Swerim AB)

Presenter: Dr JARNERUD ÖRELL, Tova (Swerim AB)

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