15th K1-MET Scientific Exchange Day

8 – 9 April 2026, voestalpine Stahl GmbH,
Guest House, Betriebsgebaeude BG (Building) 44, First Floor – Room 1,
voestalpine-Strasse 3, 4020 Linz, Austria

Main goal of the Scientific Exchange Day (SED) is to present current research activities and results of K1-MET and its partner network. Furthermore, the SED represents an opportunity to stimulate the interactions between the scientific and the company partners of K1-MET with plenty of time for discussions.

8 April 2026 Keynote

17.00 – 18.00	Keynote: Prof. Christian Stoecker (Hamburg University of Applied Sciences (HAW Hamburg), Germany) "Faster than you think – surprising facts about energy"
18.00 – 19.30	Get together

Abstract Keynote: Christian Stoecker

"Faster than you think – surprising facts about energy"

Europe is struggling with the transition to renewable energies, with talk of 'special paths' and 'going it alone'. However, the global picture looks completely different. The exponential function plays a central role here – as does the psychological and human inability to consistently think through accelerated developments. It is not only laypeople who are affected by this.

9 April 2026 15th Scientific Exchange Day

08.30 – 09.00	Registration and Come together
09.00 – 09.15	Opening words and and short information about the new COMET funding application (Management Board)

Success Stories COMET

Moderator: Susanne Michelic

09.15 – 09.40	Success Story Area 1: László Sólyom (K1-MET) Topic: Metal segregation during continuous casting of low alloy steels – COMET Project 1.4
09.40 – 10.05	Success Story Area 2: Andreas Niederhauer (K1-MET) Topic: Methanation of CO_2 from real off-gas streams – COMET Project 2.4
10.05 – 10.30	Success Story Area 3: Barbara Weiß (K1-MET) Topic: Investigations of calcination and sintering in simulations and macro TGA experiments – COMET Project 3.2
10.30 – 10.45	Coffee break

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10.45 – 11.10	COMET Module FuLIBatteR: Bettina Rutrecht (K1-MET) Topic: Material Flow Analysis and Life Cycle Assessment for the recycling of Lithium Ion Batteries
11.10 – 11.35	COMET Module PlasmArc4Green: Magdalena Schatzl (K1-MET) Topic: Simulation, modelling and monitoring of plasma- and arc-based metal production processes
11.35 – 11.40	Closing words (Management Board)
From 11:40	Lunch

Abstract Success stories

Research Area 1: László Sólyom (K1-MET)

"Fracture of Continuously Cast Slabs Beyond the Second Ductility Minimum – Experimental insights using established methods and 21st-century characterisation techniques"

A Conventional continuously cast steel grades may be classified as critical when slab failure occurs during straightening in the casting process or subsequently during cooling, stacking, or reheating. The fracture of a single slab can release substantial amounts of stored elastic energy, potentially causing severe material damage, local production shutdowns, and even personal injuries. In the present case, a low-alloy carbon steel was investigated for which failure events had been documented during the stage of cooling and reheating. The experimental investigation procedure, the results obtained, and the conclusions drawn are presented and discussed in order to explain the documented sensitivity.

Research Area 2: Andreas Niederhauser (K1-MET)

"CO_2 Methanation with real flue gas – an upscaling study"

This study investigates the influence of real flue gas components on the methanation of CO_2 to CH_4. CO_2 is generated during combustion processes in the power plant of an integrated steel mill and is often directly emitted into the atmosphere. Through methanation, CO_2 can be integrated into a carbon cycle and reused. This approach has the potential to reduce CO_2 emissions in the long term while enabling the efficient utilization of green hydrogen until industrial processes are fully converted to hydrogen-based technologies. The objective of this work is to evaluate whether catalysts are suitable for the methanation of captured CO_2 from an amine scrubber, whether they ensure stable long-term operation, and which process parameters significantly influence the reaction. For this purpose, experimental parameters such as temperature, pressure, gas hourly space velocity (GHSV), and hydrogen excess were systematically varied. The results show that CO_2 conversion rates of up to 99.65% can be achieved. Residual components in the purified CO_2 stream (purity of 99.6%), such as H_2O, N_2, and SO_x (<1 ppm), have little influence on catalyst activity, even during extended operation. Overall, the results demonstrate that catalytic methanation is feasible using real flue gas streams. This process can produce valuable energy carriers and contribute to the long-term reduction of industrial CO_2 emissions during the transition toward more sustainable energy systems.

Research Area 3: Barbara Weiß (K1-MET)

"Investigating Industrial-Scale Calcination and Sintering – A Novel MacroTGA Supports Model Development"

A newly commissioned MacroTGA system enables the investigation of calcination kinetics and sintering behavior of industrial-scale samples at temperatures up to 1800 °C under controlled gas atmospheres. The novel system reliably captures mass loss associated with decomposition reactions during calcination. The captured mass loss, together with the analysis of morphological changes in the samples caused by sintering, supports the development of a detailed calcination and sintering model based on an Euler-Euler multiphase framework.

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COMET Module FuLIBatteR: Bettina Rutrecht (K1-MET)

"Assessing Recycling Efficiency in Lithium-Ion Battery Recycling – Results from the COMET Module FuLIBatteR"

Recycling efficiency has become a central indicator for evaluating lithium-ion battery recycling technologies and demonstrating regulatory compliance. However, determining reliable efficiency values is far from trivial, as results strongly depend on system boundaries, material-specific recovery definitions and the completeness of mass flow data. Within the COMET Module FuLIBatteR, a structured methodology was developed to transparently assess recycling efficiencies across process chains. The presentation highlights key methodological challenges, discusses optimisation potentials and positions the project's findings in the broader context of technology comparison and performance benchmarking.

COMET Module PlasmArc4Green: Magdalena Schatzl (K1-MET)

"PlasmArc4Green – Simulation, Modelling and Monitoring of Plasma and Arc Based Processes for Green Metal Production"

PlasmArc4Green advances simulation, modelling and experimental characterization of arc plasmas for metallurgical applications. A core focus is the development of detailed simulation models that resolve plasma properties, arc attachment dynamics, and the interaction of arc plasmas with solid and liquid interfaces. In parallel, PlasmArc4Green develops advanced in-situ diagnostic techniques, including optical emission and absorption spectroscopy as well as high-speed imaging, to provide rigorous validation data for the numerical models and real-time data for process control. In this talk, we will present intermediate results obtained during the first one and a half years of the project, highlighting key technical insights and remaining challenges for next-generation plasma technologies in sustainable metallurgy.

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