Einladung zu einem Promotionsvortrag

Vortragender:	Simon Kammerer
Thema:	Strategic Decision-making for Energy Flexibility Investments in Industrial Processes: A Simulation-based Approach
Inhalt:	Industrial energy flexibility has been identified a promising candidate to help relieve grid congestions, support renewable integration and reduce operating costs at industrial sites. In today's practice it is rarely activated. The bottleneck is found not to be the technical potential, but a combination of policy uncertainties, contradicting incetive structures and the absence of assessment instruments that practitioners can actually apply to the specific economic, regulatory and operational conditions of a given site. This work develops such an instrument from the perspective of the industrial site itself. A node-edge architecture is used to represent arbitrary energy carriers and material flows in a single balance logic. An algorithm is presented to translate reulting graphs into LP or MILP optimization problems. Monte-Carlo sampling and a nested black-box approach are applied to extend the analysis to identify optimal asset dimensioning and scenario uncertainty considerations. The framework is demonstrated on two case studies of different character. The first plans a greenfield waste-recycling site, integrating a wide range of electrical assets and a process model – resulting in a cost-emission Pareto frontier and the insight, that coordinated flexibility can unlock a substantial part of the grid and storage capacity to be used for arbitrage trading without compromising the core process. The second compares three decarbonized DRI steelmaking pathways across a wider range of market and policy scenarios, mapping the conditions under which individual process variants dominate when considering their flexibility potentials.
Termin:	20.07.2026 10:00

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