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Coupled Production of Steel and Chemicals

M. Bender[1], T. Roussiere[1], H. Schelling[1], S. Schuster[1], E. Schwab[2]
[1]BASF SE

Abstract

In a subproject of the Carbon2Chem© Verbundprojekt, we studied a potential production of oxymethylene ethers (OME) as possible diesel fuel components or substitutes. The study was aimed at reducing CO_2 emissions from mobility and steel manufacturing by rededicating steel mill gases to the production of methanol as an important OME precursor.
Six different scenarios for CO_2 emission reduction in steel mills were calculated, in four of which methanol is generated as an OME intermediate from steel mill gases. Potential synergies in raw material and energy streams of the coupled processes were identified. Shared process streams and equipment could lead to savings in capital and operational expenditure.
CO_2 reduction volumes and avoidance costs were calculated for the six scenarios. If coupled with methanol production, natural gas-based direct reduced iron processes offer the chance for quantitative CO_2 emission reduction at the lowest CO_2 avoidance costs. Energy required for this process could be co-fed, e.g., as renewable electricity.

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[2] Dr. Ekkehard Schwab has since retired from BASF.