

Carbon2Chem®

# Gas Purification on an Industrial Scale From Steel Mill Gases to Clean Syngas

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## Objective

Steel mill gases like blast furnace gas, basic oxygen furnace gas and coke oven gas are currently used for heating purposes and for production of electric power, generating greenhouse gas emissions thereby. Carbon2Chem® lays the basis for the chemical use of these gases containing valuable components and shows the pathway to generate purified clean syngas made from steel mill gases.

## Key challenge

### Reliable removal of catalyst poisons

On one hand the current use of steel mill gases like blast furnace gas, basic oxygen furnace gas and coke oven gas as fuel gases for power and heat results in greenhouse gas emissions while on the other hand fossil resources are exploited to produce chemicals. Carbon2Chem® shows the way to transform the gaseous side products of a steel mill into purified clean syngas for chemical uses.

However, impurities and catalyst poisons need to be removed from these gases in a reliable, save and cost efficient manner. Different cleaning stages, equipped with adsorbent materials and catalyst from Clariant, have been tested during the operation of the gas treatment pilot plant using real steel mill gases in order to prove this novel approach of a cross industrial cooperation between the steel, power and chemical sector.

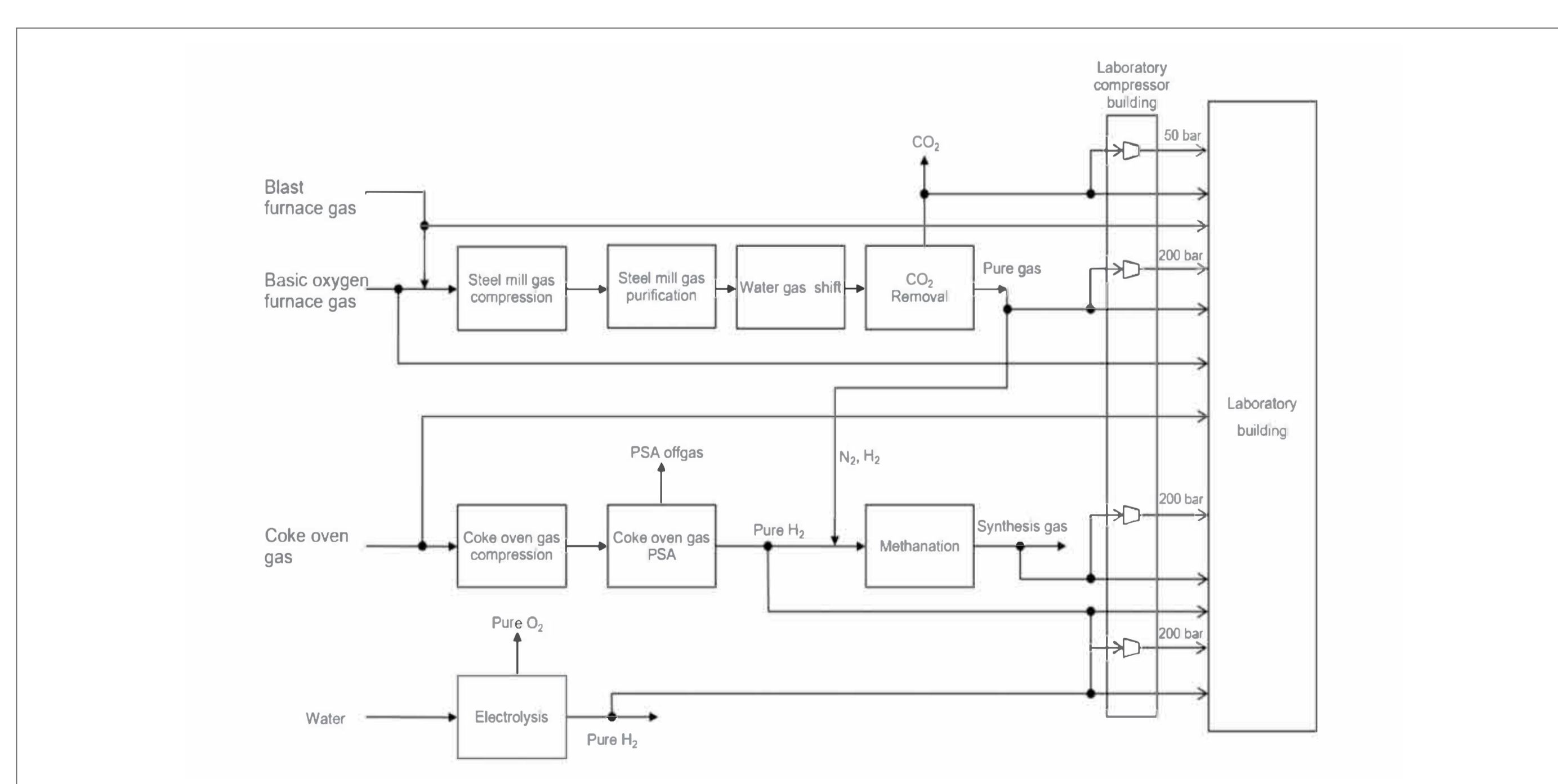
In cooperation with MPI-CEC potential catalyst poisons in the feed gases were identified and the removal in the gas treating plant monitored.

## Conclusion

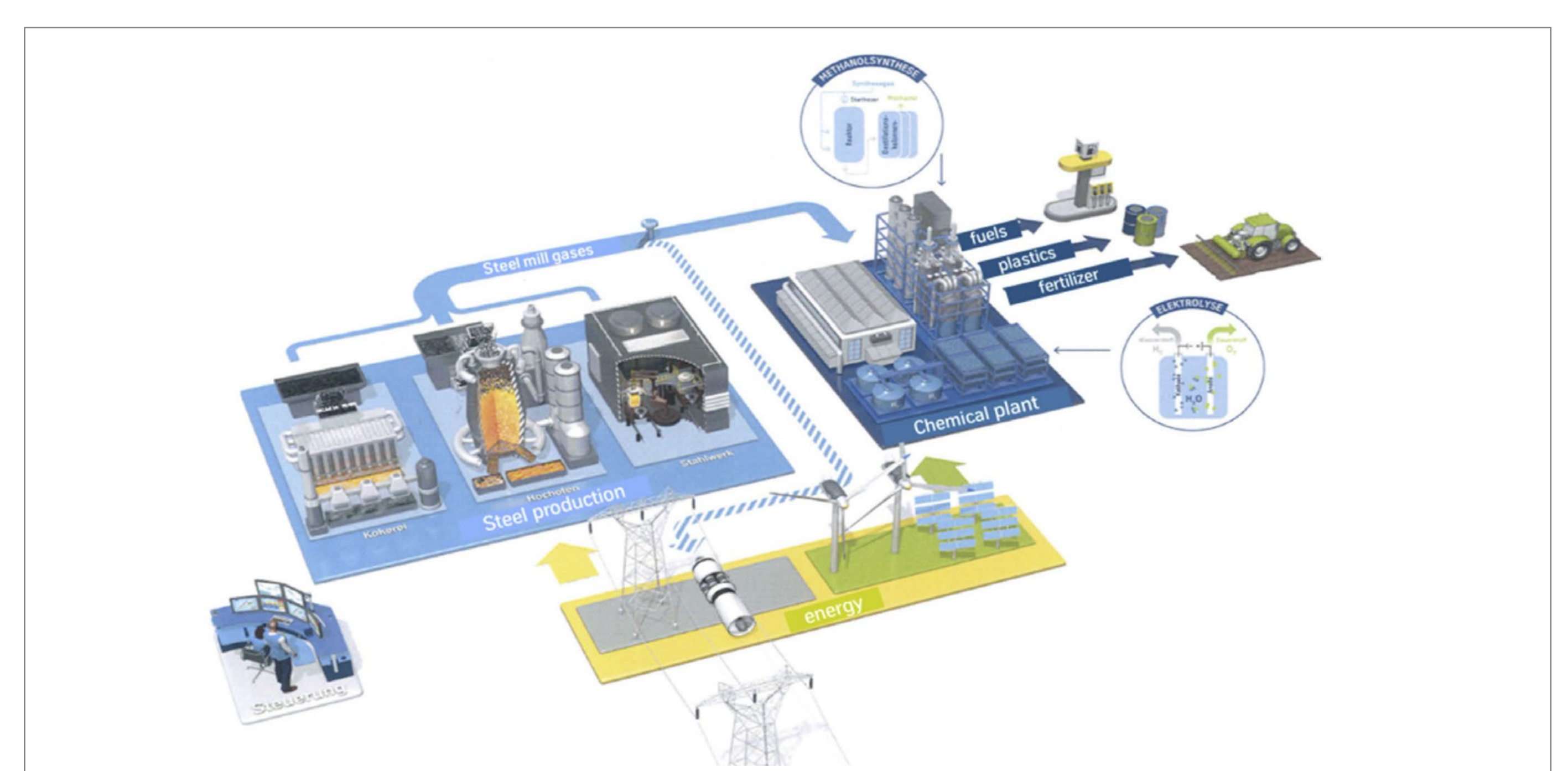
### Ready for implementation

The operation of the gas treatment pilot plant using real steel mill gases generated during raw iron and steel production for more than 44 000 operation hours showed the prove of concept of the selected design of gas treating steps for the generation of a clean synthesis gas for the production of methanol and ammonia. The results and findings obtained from the pilot plant operation form the basis for gas treating strategies which can be applied for off-gases also in other industry sectors.

The design of the gas treatment pilot plant is the basis for a further development of the gas treating concept with more focus on the energy and heat optimization as well as enhancements to improve the flexibility of the plant. This is even more important not only for the application at existing steel mills based on the use of blast furnace technology but in future also for steel mills based on the DRI route (direct reduced iron) still generating hydrogen and carbon rich process streams to be transformed into valuable syngas sources.



The Carbon2Chem® gas treatment pilot plant.



The cross industrial approach for steel, chemicals and power.

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CO<sub>2</sub> reduction by cooperation of process industrial sectors