The Carbon2Value project has received support from the Interreg 2 Seas program. The total project budget is 10.5 million euros, of which 4.4 million euros ERDF subsidies. The project is focusing on a specific objective of low carbon technologies.

Carbon2Value
Output O6.1: Technology's economic feasibility study

- Public Version

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Approved by	Carbon2Value Consortium		
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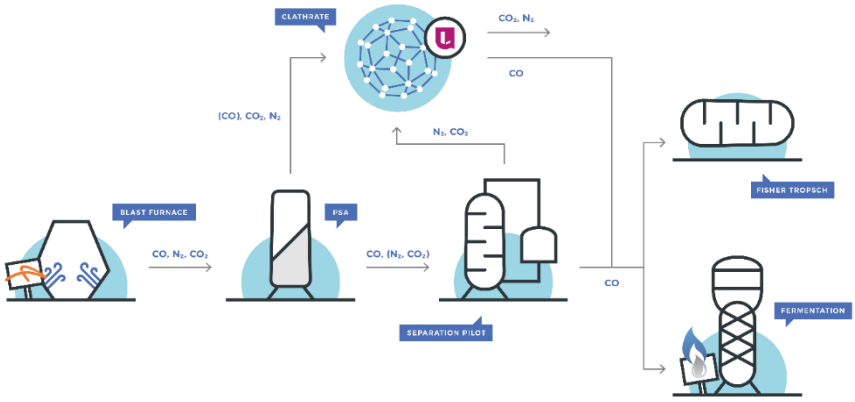
Summary

Steel waste gas from the blast furnace is directed to a Pressure Swing Adsorption (PSA) installation to separate Carbon Monoxide (CO) from the other gases. The PSA's main output is a CO-rich gas which is directed to the separation pilot installation to produce a CO gas stream, which can be valorized via two routes:

1. Bio-fermentation to ethanol (as feedstock for ethylene)
2. Fisher Tropsch catalytic conversion to naphtha (as feedstock for ethylene).

Techno-economic feasibility study is done for both pathways. To evaluate the economic feasibility the following methodology was followed:

- Process design parameters were taken from the equipment engineering design
- Potential market data were collected for the most important impact variables
- Business models were developed taking into account the process design parameters and economic impact variables.



Using sensitivity analysis for the most critical process and economic parameters the fermentation pathway seems techno-economically viable. Market analysis shows that there is a significant potential for ethanol as a biofuel and feedstock for ethylene feedstock.

The preliminary assessment for this project gives some indication about the oil-price equivalent at which the production of synthetic naphtha could become economically attractive. A sensitivity analysis shows that the economic viability is impacted by the applied price sets and heavily depend on the local situation with respect to by-product yields and by-product credits (fuel gas, steam, etc.), electricity pricing, CO2 capturing costs, ETS trading scheme costs, investment costs, etc. Modelling several parameters with assumptions on future developments (with respect to markets, pricing and industrial symbiosis) have shown that it is possible to produce synthetic naphtha with attractive economics at a break-even versus oil price at 50-75 $/barrel, i.e. within the limits of current long-term oil price developments. It must be stated that the sensitivity to the Carbon2Value output data is also high and that a detailed analysis based on the 2020 operational data will allow a final conclusion.