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C2V - Carbon to Value

Development and demonstration of low carbon technologies to transform CO and CO2 streams from the steel industry into new value chains

Project number	DE-00-16
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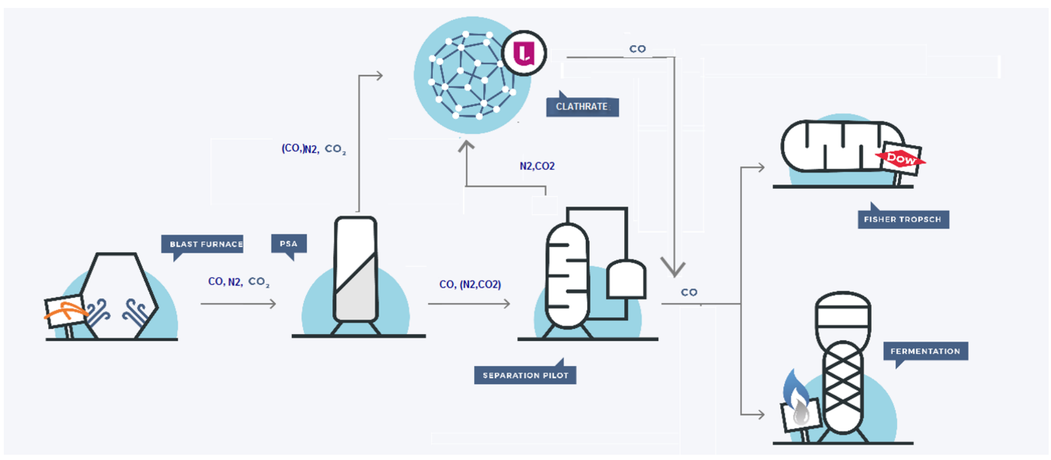
Partners	Arcelor Mittal (project secretary), Dow, ISPT, Lanzatech, POM Oost-Vlaanderen, Université de Lille
Budget	10 500 k€
Duration	2017-2020

Incentive

In this joint initiative, the consortium will demonstrate a potential reduction of CO_2 emissions (30-45%) across the energy intensive steel sector by demonstrating an innovative technology to separate CO_2 streams and valorise CO and potentially CO_2. Two valorisation routes will be studied during the project, i.e. ethanol as a drop-in transportation fuel and synthetic naphtha as a drop-in chemical feedstock.



Objective

The objective is to demonstrate the potential of reduction of GHG emissions in the steel sector by >30%, by implementing a cost efficient breakthrough solution for the separation of valuable gasses. This will be achieved by separation of carbon rich waste gases into a stream rich in CO and a stream rich in CO_2that could be valorised into promising chemical building blocks in the future. The project will also take into account the re-use of any by-products to further induce fossil fuels' replacement and GHG emissions reductions.

Scope

- Pilot tests of CO_2 separation technology & CO conversion technology in a relevant technical environment (TRL5-6)
- Assessment of the quality of separated streams for future applications
- Create awareness of the project and favour future roll-out and replication of the technology across borders

Solution

Blast furnace gas is directed to a Pressure Swing Adsorption (PSA) installation to separate Carbon Monoxide (CO) from the other gases or to an amine scrubber. The main output will be a CO-rich gas which is directed to the separation pilot installation to produce a CO gas stream, which can be valorised via two routes:

1. Catalytic conversion to synthetic naphtha (FT technology)
2. Biofermentation to ethanol

On the CO poor tail gasses from the PSA and separation pilot installation, tests will be performed using Clathrate technology, where CO will be separated from nitrogen (N_2) and other gas components.

Partners

ArcelorMittal · LanzaTech · POM Oost-Vlaanderen · Dow · Institute for Sustainable Process Technology · Université de Lille

Institute for Sustainable Process Technology

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