TATA STEEL

TATA

Project EVEREST

CATO Meets the Projects

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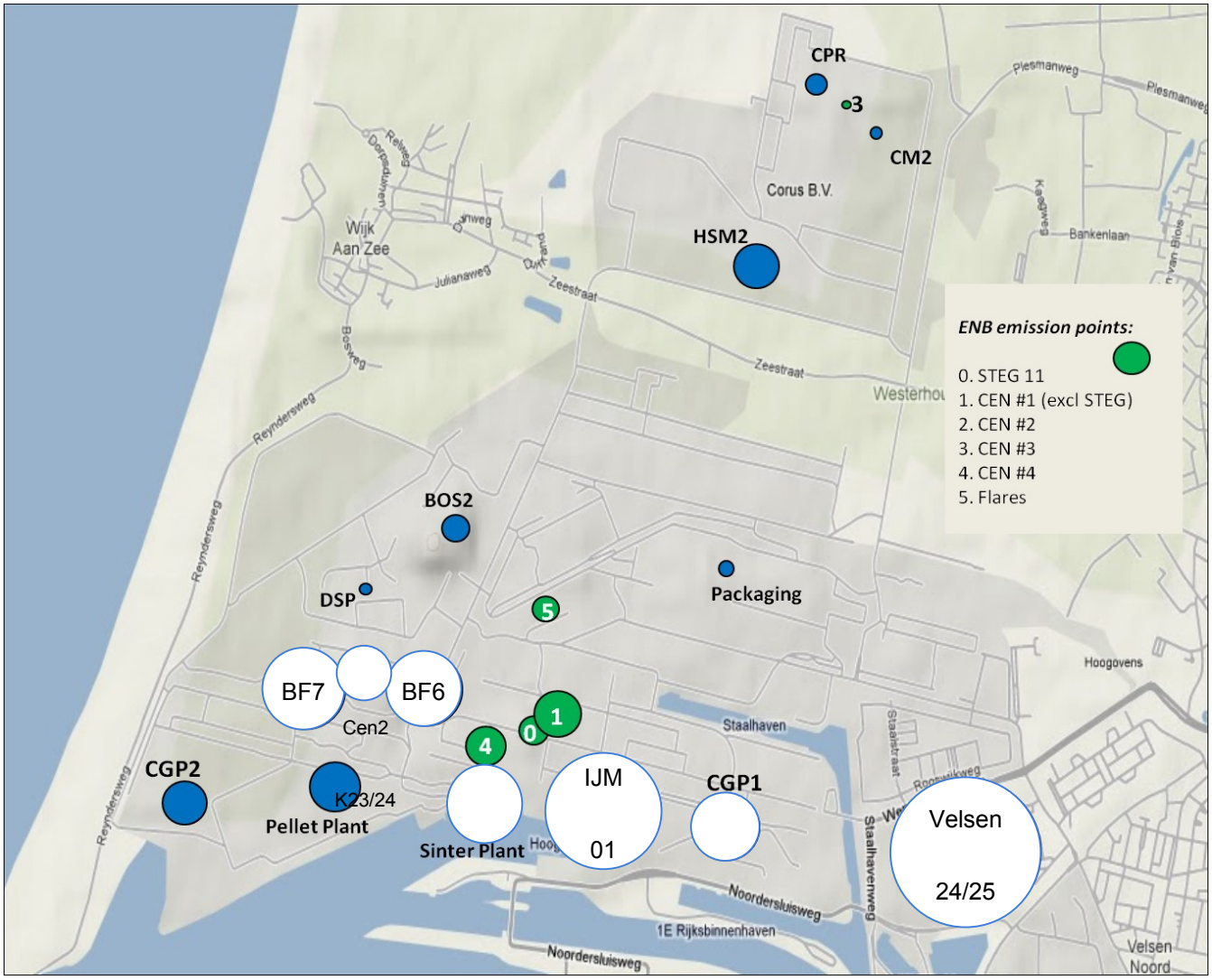
What's in a name ?

Enhancing **V**alue by **E**missions **R**e-use & **E**missions **ST**orage

EVEREST

Primary target of Everest is to reduce Tata Steel's CO_2 emissions by ~4 Mtonne/a



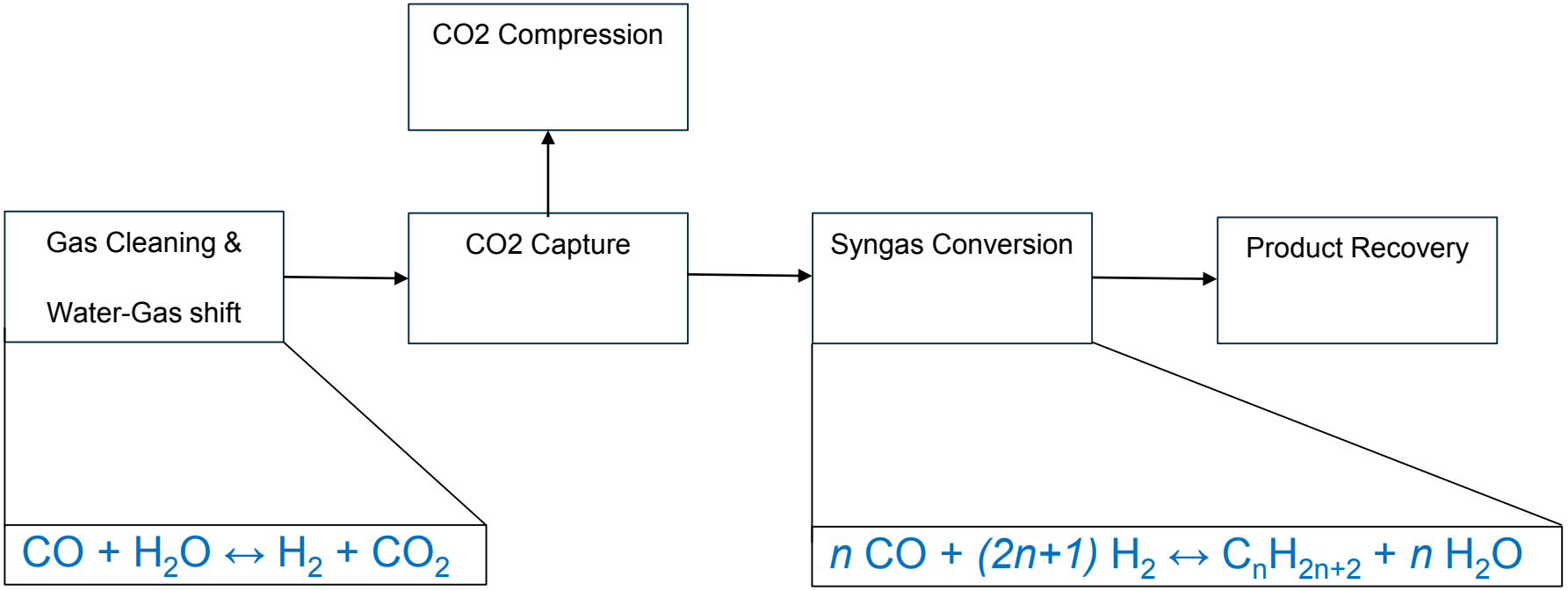
Achieving the goals of Project Everest is ambitious, but as a wise person once said:

"I've never done it before, so I think I can do it"

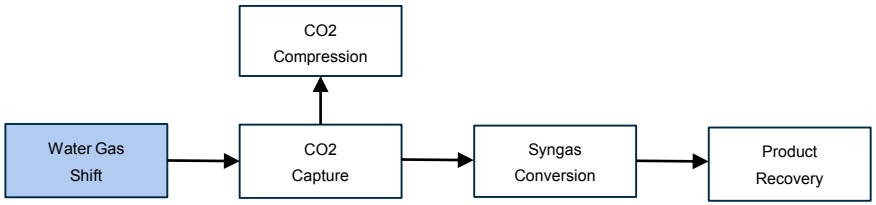
"Ik heb het nog nooit gedaan, dus ik denk dat ik het wel kan"

- Inger Nilsson

Block Diagram



Water gas shift

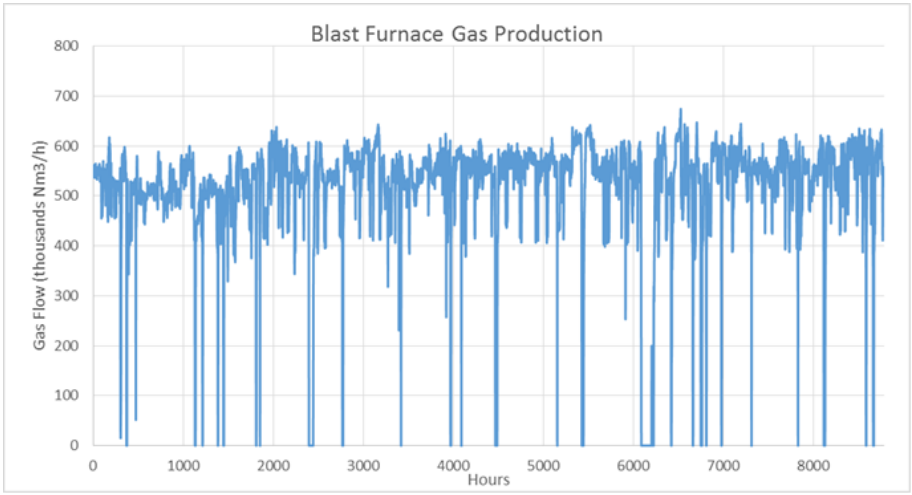


Function

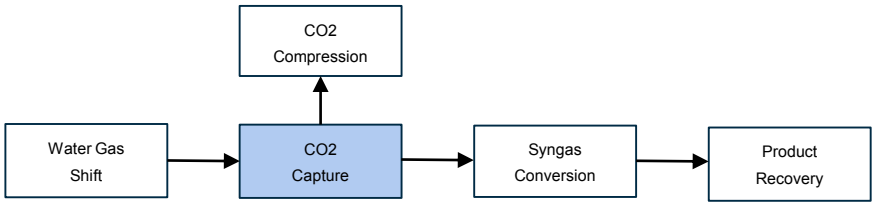
- To adjust the H_2:CO ratio in the Blast Furnace Gas to make it suitable for syngas conversion. (In the case of naphtha, 2.1:1)

Main challenges:

- Incorporate gas cleaning in design (removal of nitrogen and sulphur compounds)
- Flexibility to deal with unexpected flow fluctuations



CO_2 Capture



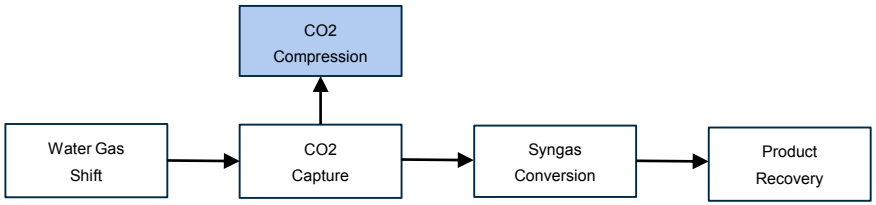
Function

- To capture the CO_2 from the gas stream at the point where the concentration is at a maximum. The technology chosen is a high pressure amine wash.

Main challenges:

- Handling of flow fluctuations in the feed gas flow
- Optimisation in trade-off between Opex and Capex

CO_2 Compression



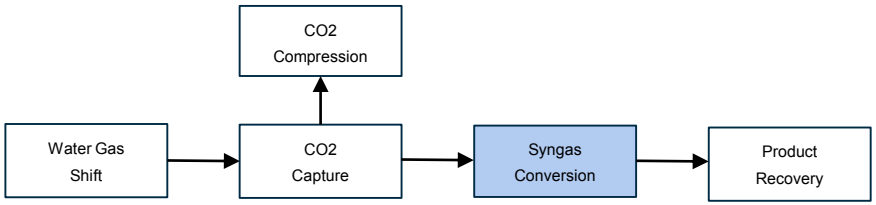
Function

- To pressurize the CO_2 to the required pressure at the point of custody transfer with Athos project.
- Post capture treatment for moisture and H_2S removal

Main challenges:

- Handling of flow fluctuations in the feed gas flow
- Heat integration with other plant components

Syngas Conversion



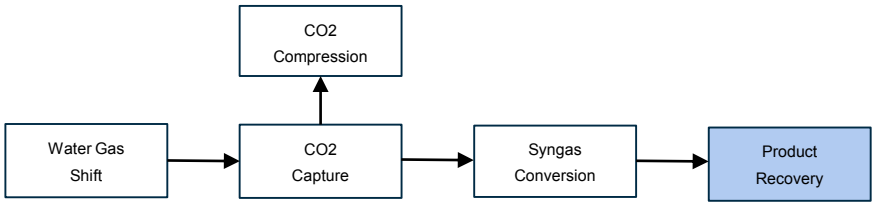
Function

- To convert syngas to a base chemical and keep a part of the C-atoms in the Blast Furnace Gas “locked in” for the long term
- Potential products are naphtha, methanol, acetic acid, kerosene, ammonia and methane. Base case is naphtha production through Fischer-Tropsch reaction

Main challenges:

- Handling of flow fluctuations in the feed gas flow
- Heat integration with other plant components
- Long term catalyst performance
- Main issues to be addressed in a pilot plant to be operated in Gent (AM) and IJmuiden (TS)
- Project partners pilot plant: DOW, Arcelor Mittal, ISPT, University of Gent, ECN and Tata Steel

Product Recovery



Function

- Hydrocarbon post-processing (e.g. drying) and separation of the gaseous phase (C_{1-4}) from the liquid phase (C_{5-10})

Main challenges:

- What to do with the purge gas ?

Indicative Milestone Schedule Everest