



a H2020 Project

# WP1: Design & Construction STEPWISE pilot unit

Deliverable 5: Pilot Plant delivered and connected

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This Deliverable 1.5 Demonstrator is part of a project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 640769

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# Pilot plant lay-out

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The STEPWISE Pilot Plant consists of the following sections Building in the Building and MCC/Ventilation/Electric **BFG** compression Steam generation N<sub>2</sub> supply WGS skid SEWGS skid Flare Automation system and gas analysis system



## Pilot plant layout

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# Pilot location







# Building in the Building

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The Building in the Building (BiB) is erected inside Demo Hal 2 and houses the WGS, SEWGS and thermal oil skids

- ATEX classified building
- 8-fold ventilation
- Phase 1 completed February 2017
- Phase 2 completed August 2017









## BFG compression

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An oil lubricated twin-screw compressor is installed in a new building next to Demo-Hall 2 at Swerea Mefos

- ATEX classified building
- 800 Nm<sup>3</sup>/h BFG compression to 25 bar
- Compressor by Opcon Energy Systems, Sweden
- Building ready September 2016
- Compressor delivered December 2016
- Compressor commissioning February 2017











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The electric boiler system with electric super heater are installed inside Demo Hall 2

- 550 kg/h superheated steam at 25 bar and 400°C
- Steam supply for WGS reactor and SEWGS reactor
- Steam system by PannPartner AB, Sweden
- Steam system delivered November 2016
- Steam system commissioning May 2017

The N<sub>2</sub> compressor and buffer tank are installed inside Demo Hal 2

- 200 kg/h N<sub>2</sub> at 32 bar
- N<sub>2</sub> supply for safety and for SEWGS reactor
- System delivered by Hoerbigger, Sweden
- Components delivered September 2016
- N<sub>2</sub> supply commissioning November 2016







### WGS skid



The WGS skid is installed a special ATEX building erected inside Demo Hal 2

- Single WGS reactor, 400 l catalyst
- Bulk conversion of CO in BFG
- WGS skid constructed by Harsveld, The Netherlands
- Skid shipment to Mefos April 2017
- WGS commissioning planned September 2017







# SEWGS skid



The SEWGS skid is installed a special ATEX building erected inside Demo Hal 2

- Single column, 2.5 m<sup>3</sup> sorbent
- CO<sub>2</sub>-H<sub>2</sub> separation
- SEWGS skid constructed by Harsveld
- Skid shipment to Mefos March 2017
- SEWGS commissioning planned September 2017











## Flare

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The flare on the west-side of Demo Hall 2 was erected

- 2 Propane pilot-burners supported flare
- Flare delivery August 2016
- Flare commissioning October 2016









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# Control system and gas analysis

The control room of Demo Hall 2 was refurbished

- Siemens-based control system, PCS7
- Gas analysis comprises
  - Gas chromatograph
  - Mass spectrometer
  - Infra-red analyser







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