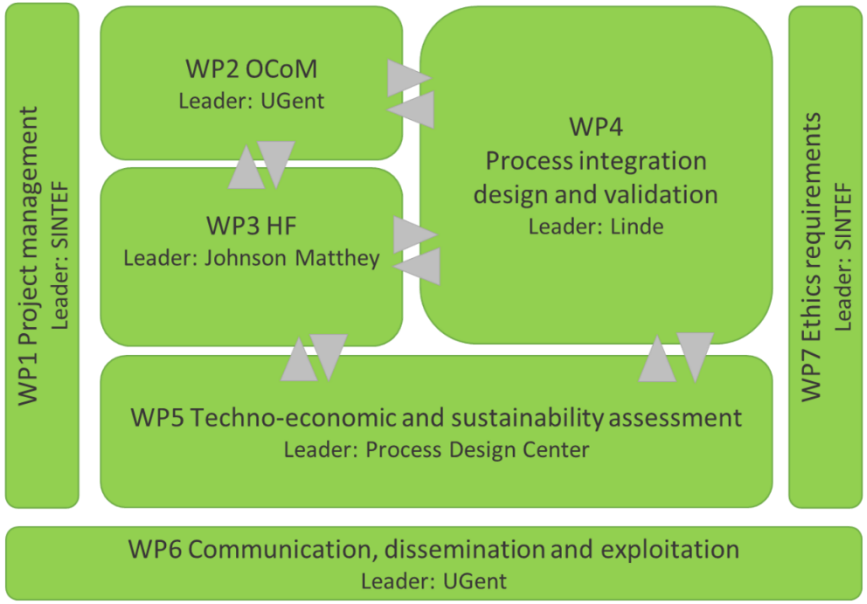
C123: What we are doing

The activities are divided into 7 work packages:

- WP1: Project management
- WP2: Oxidative Conversion of Methane (OCoM)
- WP3: Hydroformylation (HF)
- WP4: Process integration design and validation
- WP5: Techno-economic and sustainability assessment
- WP6: Communication, dissemination and exploitation
- WP7: Ethics requirements



Project information

Duration: 1/01/2019 – 28/02/2023
Budget: € 6.4 M
Contact: Richard Heyn (rhh@sintef.no)

https://www.sintef.no/c123

The C123 project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 814557.

C123
VALORISING METHANE RESOURCES

C123

Methane oxidative conversion and hydroformylation to propylene

What is C123?

C123 will valorize currently largely available yet **unexploited methane resources by an efficient and selective transformation into C3 hydrocarbons**, particularly aiming at propylene. The breakthrough innovation is that propylene will not be produced via the very energy intensive steam cracking, but rather by less energy demanding and more selective build-up from smaller molecules.

In C123 the selective transformation of methane to C3 hydrocarbons will be realized via a combination of Oxidative Conversion of Methane (OCoM) and hydroformylation (HF). OCoM as such comprises the Oxidative Coupling of Methane (OCM) and several complementary reactions, such as reforming, partial oxidation, ethane dehydrogenation and water gas shift.

What are the main goals?

All C123 technologies exist at TRL 3 and the objectives of C123 are the **further development to TRL4 and TRL5**. For OCoM the main goals are to **increase the methane conversion to 50% and include CO_2 in the feed**. For HF the main goals are to develop **more active and stable catalyst** that can be operated at **higher temperatures** without deactivation and at **lower pressures** without activity loss and to reach higher conversions during the HF of impure gas streams.

The findings are expected to result in an **increase in carbon efficiency of at least 25%**. In addition, selective production of **C3 intermediates** (propanol, propanal), which can be easily transported and converted to propylene for further use, is targeted. Overall, **at least 30% of fossil fuel consumption can be saved**, and this can **potentially increase up to 100%** when combining biogas as feedstock with hydrogen generated by electrolysis.

Who we are: the C123 consortium

The consortium consists of **11 partners from 7 different European countries** (Norway, Belgium, France, United Kingdom, Germany, Azerbaijan and The Netherlands) with 6 industrial partners, 2 Research and Technology Organisations, 2 Universities and 1 association, whom all have large previous experience in national and international research and innovation projects.

Project coordinator: SINTEF (Richard Heyn)

Scientific manager: UGent (Joris Thybaut)