Project No:
764697

Project acronym:
CHEERS

Project full title:
Chinese-European Emission-Reducing Solutions

Type of Action: **RIA**

Call/Topic:
European Horizon 2020 Work Programme 2016 – 2017, 10. 'Secure, Clean and Efficient Energy', under the low-carbon energy initiative LCE-29-2017: *CCS in Industry, including BioCCS*

Start-up: 2017-10-01
Duration: 60 months

Deliverable D2.4
1.5 MW equivalent CLC cold flow model experimentation

Due submission date: N/A (additional task)

Actual delivery date: 2020-08-12

Organisation name of lead beneficiary for this deliverable:
IFP Energies nouvelles

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Dissemination Level		
PU	Public	
CO	Confidential, only for members of the consortium (including the Commission Services and MOST)	X
INT	Confidential, only for members of the consortium	

Abstract for publication on the website of CHEERS

CHEERS conforms to the European Horizon 2020 Work Programme 2016 – 2017, 10. 'Secure, Clean and Efficient Energy', under the low-carbon energy initiative (LCE-29-2017: CCS in Industry, including BioCCS). The ambition is to improve the efficacy of CO2 capture in industry, and help ensuring sustainable, secure, and affordable energy.

The action involves a 2nd generation chemical-looping technology tested and verified at laboratory scale (150 kWth). Within the framework of CHEERS, the core technology will be developed into a 3 MWth system prototype for demonstration in an operational environment. This constitutes a major step towards large-scale decarbonisation of industry, offering a considerable potential for retrofitting industrial combustion processes.

The system prototype is based on a fundamentally new fuel-conversion process synthesised from prior research and development actions over more than a decade. The system will include heat recovery steam generation with CO_2 separation and purification, and it will comply with industrial standards, specifications and safety regulations. Except for CO_2 compression work, the innovative concept is capable of removing 96% of the CO_2 while eliminating capture losses to almost zero.

The CHEERS project is financed by the European Union's Horizon 2020 research and innovation programme under grant agreement No 764697, and co-funded by the Chinese Ministry of Science and Technology (MOST).

CHEERS started 1 October 2017 and is scheduled to end by September 2022. The estimated budget is 16 mill. EUR.

For the first time, an equivalent of 1.5 MW cold flow model of the entire loop of CLC based on IFPEN/Total concept was built and successfully operated producing an extensive experimental database. The raw data were analysed by IFPEN leading to detailed quantitative data of :

- Fuel reactor hydrodynamics
- Solid circulation control between air reactor and fuel reactor
- Transport of oxygen carrier in air reactor riser
- Carbon stripper efficiency

The cold flow model was also operated to train the operators and provided valuable insights for the design, construction and operation of the future CHEERS demo unit. Important features related to commissioning and operation are also provided.