



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 D4.1:
**Design and integration of the CLC-CCS system prototype
into the existing DONGFANG's site**

Due submission date: 2019-12-31

Actual delivery date: 2020-10-28

Organisation name of lead beneficiary for this deliverable:
DONGFANG

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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 (delete this table when deliverable is PUBLIC)

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 CO₂ separation and purification, and it will comply with industrial standards, specifications and safety regulations. Except for CO₂ compression work, the innovative concept is capable of removing 96% of the CO₂ 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).

The deliverable D4.1 report the activities carried out under Task 4.1 of CHEERS project. This task is focussed on the system design and its integration in the existing DONGFANG's site. A Basis of Design (BOD) is therefore developed for the design of the demonstration plant in FEED phase. Construction strategy of the plant is studied by comparing originally foreseen retrofit strategy and grassroots. Then the integration of the plant in the existing site is studied in detail. A Hazard Identification (HAZID) assessment is carried out to ensure safe application of the foreseen design and implement proper actions. Using the process design, both operating and capital expenditures are estimated. A preliminary value engineering is also carried out to optimise the design. The works carried out in the framework of Task 4.1 define a clear basis and pathway for the upcoming Engineering design phases.