DMX Demonstration in Dunkirk: 3D Project granted by H2020: scope and objectives

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TOTAL, IFP Energies nouvelles, ArcelorMittal, Axens

18/06/2019

Trondheim

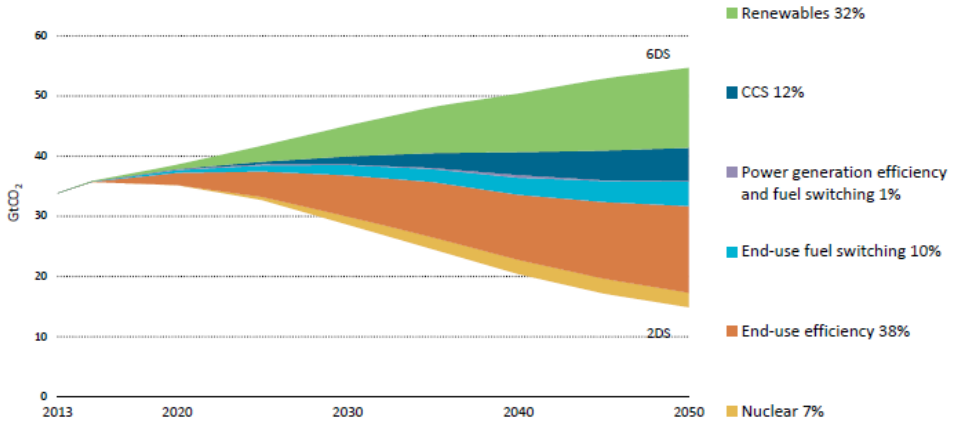
TCCS-10

Outline

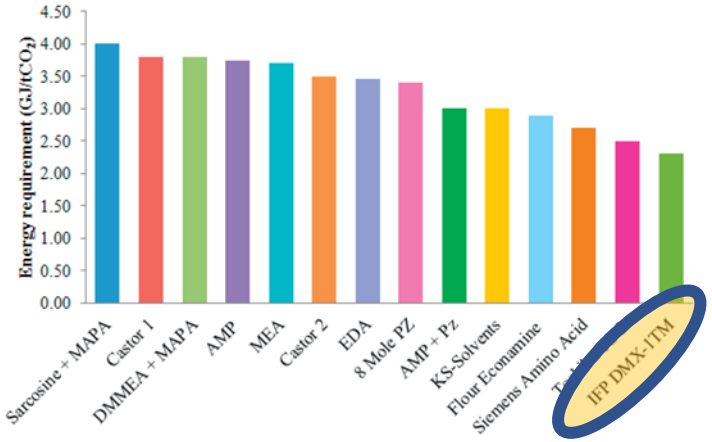
- Context
- 3D project in a nutshell and DMX technology
- Consortium
- Objectives
- Workplan

Context : GHG Mitigation

- CCS in Industry is to deliver 12 % of CO_2 emission cuts by 2050 in IEA 2DS



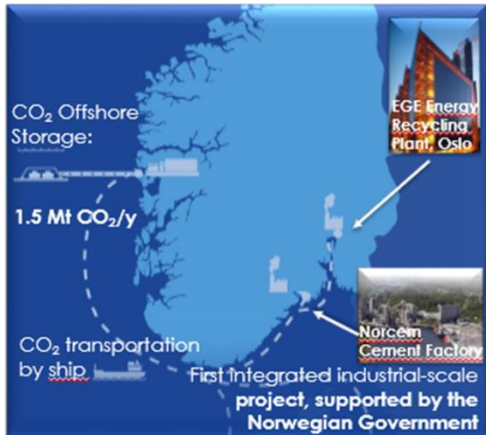
PARIS2015
CONFÉRENCE DES NATIONS UNIES SUR LES CHANGEMENTS CLIMATIQUES
COP21·CMP11



Singh P. (IEAGHG), Van Swaaij W., Brilman D.,
Energy Efficient Solvents for CO2 Absorption from Flue Gas: Vapor Liquid Equilibrium and Pilot Plant Study,
Energy Procedia 37 (2013) 2021-2046, Oral présentation ,
GHGT-11, Kyoto, 2012.

- Ambition of the European Union: reduction from 1.7 tons of CO_2 per tonne of steel to less than 1.2 in 2030, only reachable via CCS

- Norwegian project Northern Lights

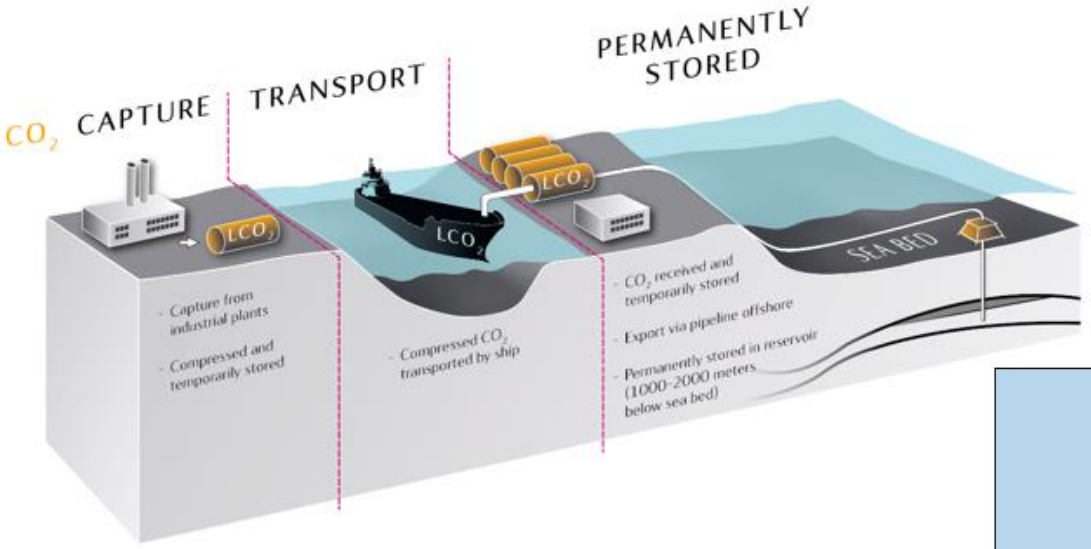


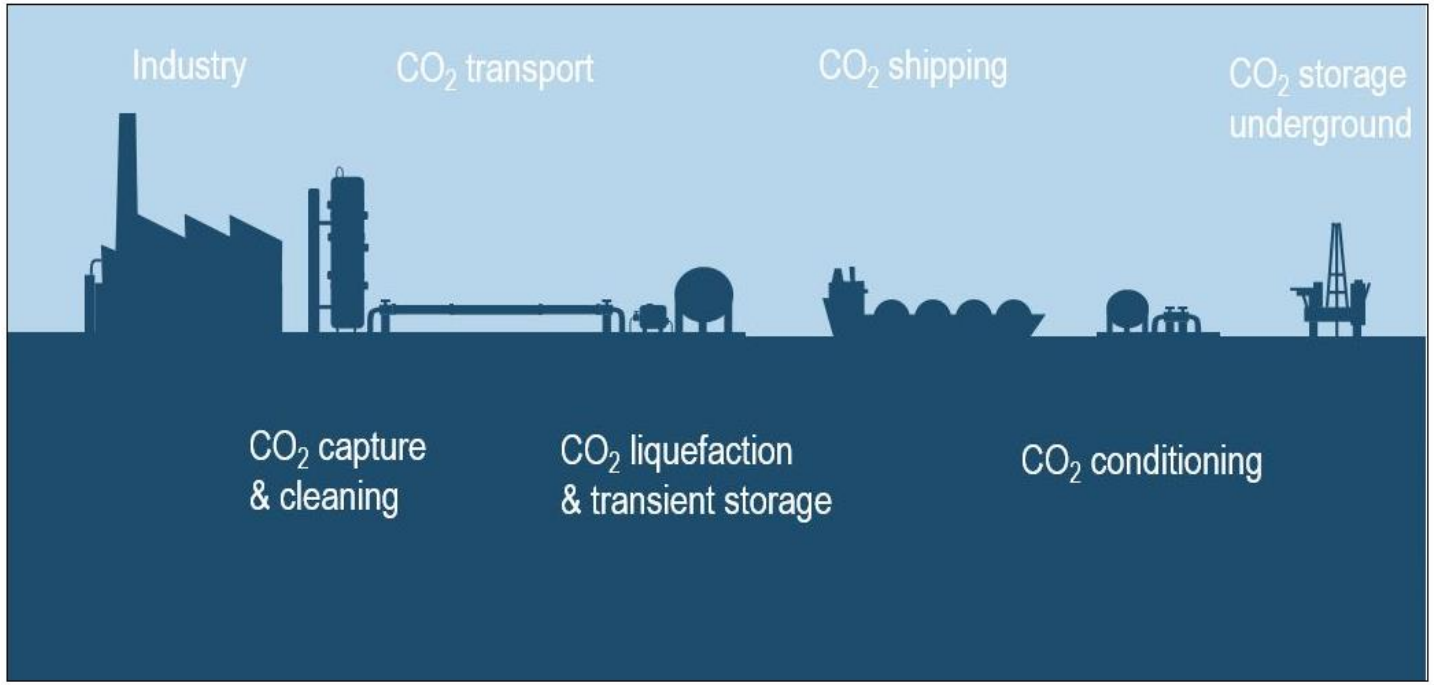
CO2 3D DMX DEMONSTRATION DUNKIRK

3D in a nuttshell

- **D**MX **D**emonstration in **D**unkirk
- H2020 project (call 2018 / topic LC-SC3-NZE-1)
- Project start-up : 01/05/2019
- Duration : 48 months
- Estimated eligible costs : 19,2 M€
- EU funding : 14,7 M€

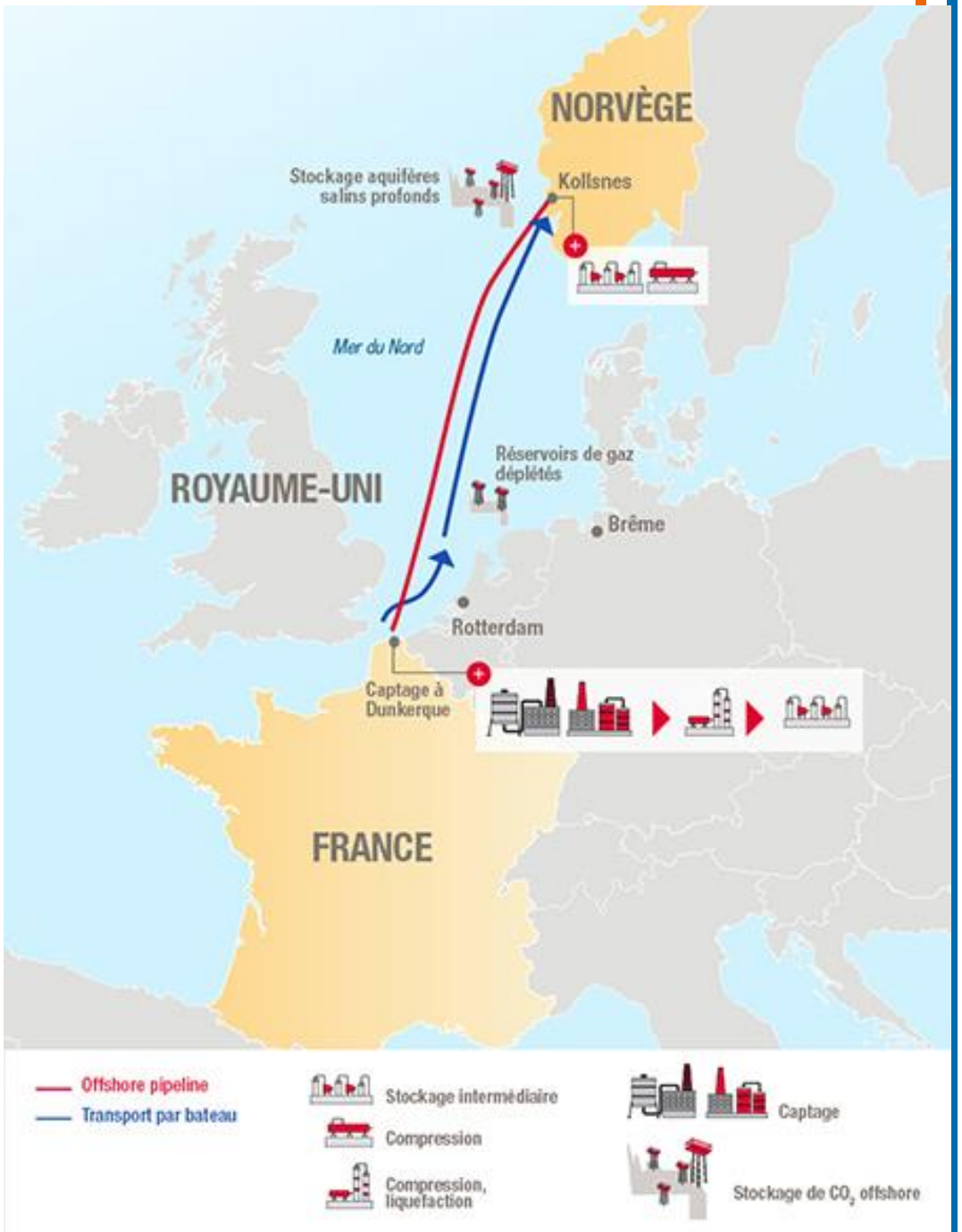
3D over the whole CCS value chain





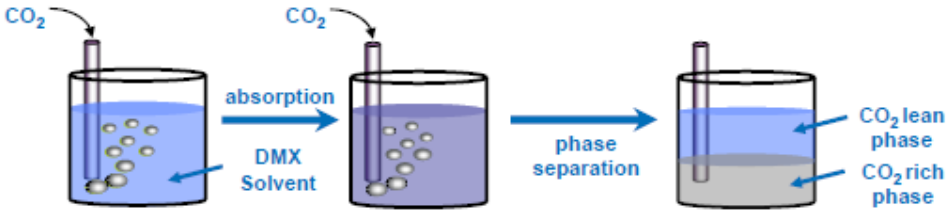
3D over the whole CCS value chain

- Dunkirk is the largest CO_2 emission zone in France
- Proximity to North Sea Storage potential zone (Northern Lights Project)
- 3D needs to demonstrate the capture technology and study all the following step, from CO_2 conditioning, transport and storage
- The Cluster approach will be investigated
  - Build a future CO_2 hub around Dunkirk with facilities

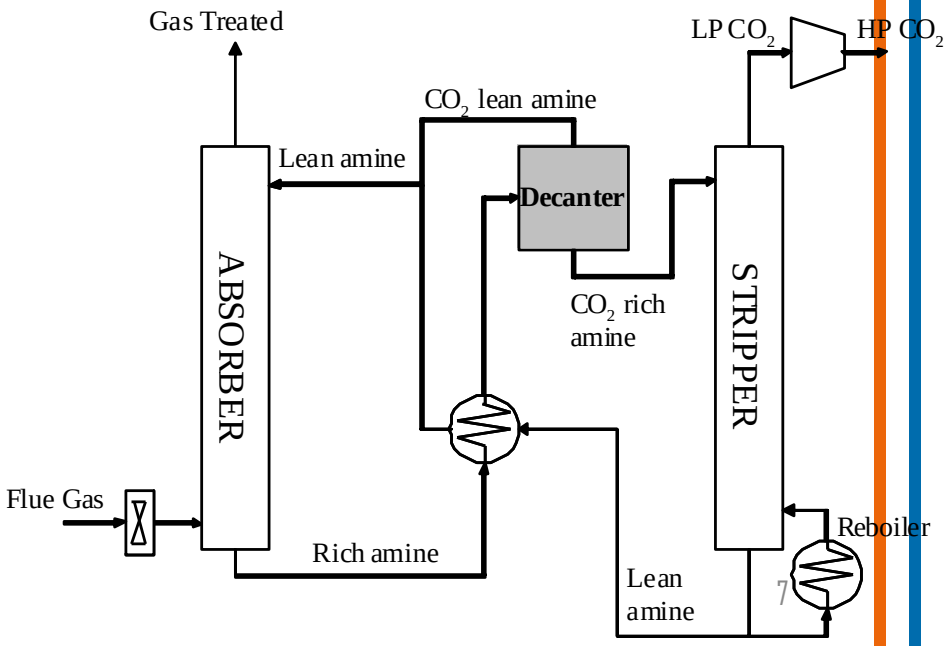


DMX technology

- DMX technology is based on the principle of a specifically designed solvent, that forms two phases when contacted with CO_2
- The two phases can be separated and only the CO_2-rich phase is regenerated : energy intensity of C-capture is reduced by 30%



1) High capacity solvent (4 times MEA)
2) Regeneration of the CO_2 rich phase only
3) Solvent very stable ➔ CO_2 produced in Pressure



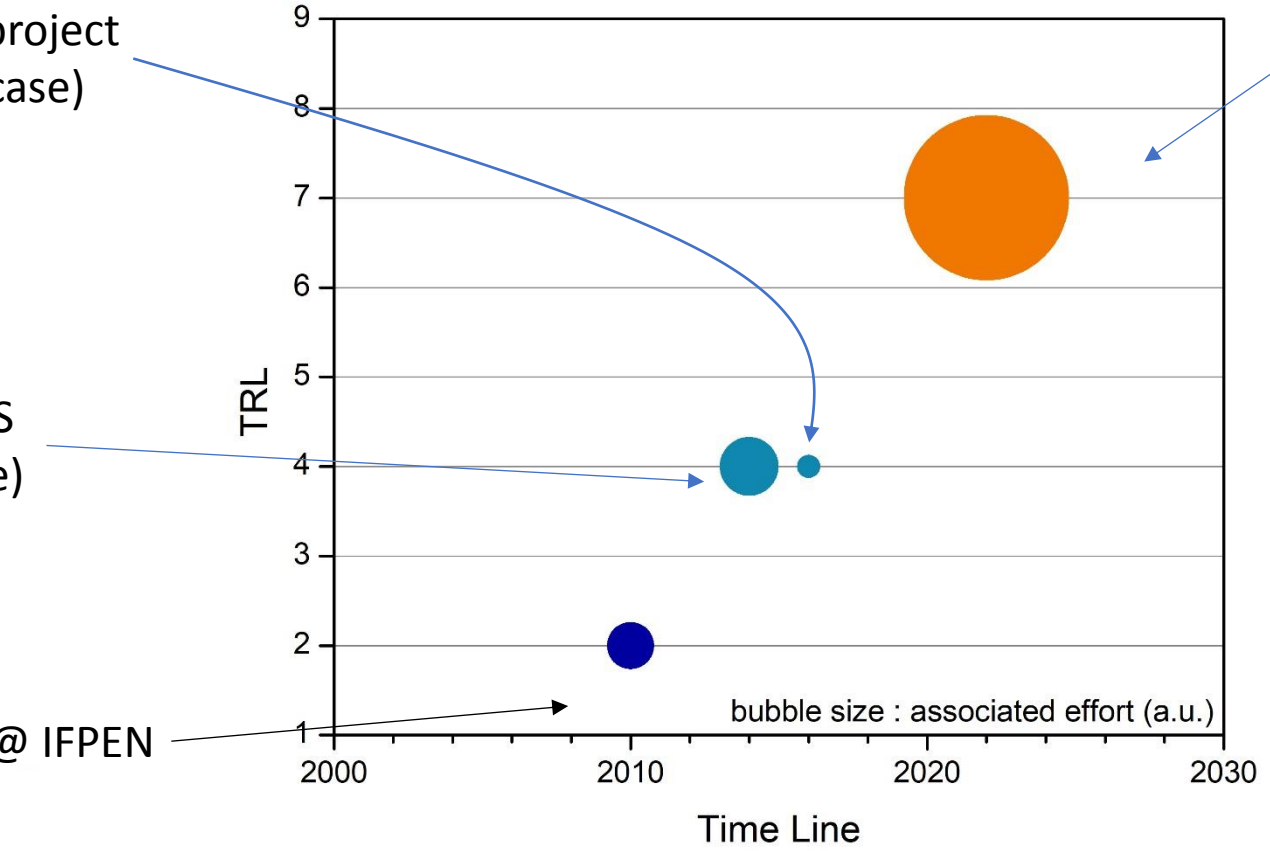
DMX technology development

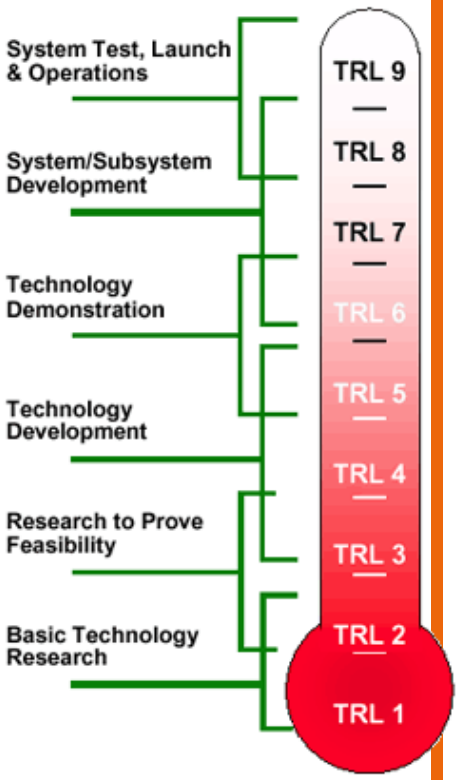
VALORCO project
(steel mill case)

OCTAVIUS
(coal case)

Lab tests @ IFPEN

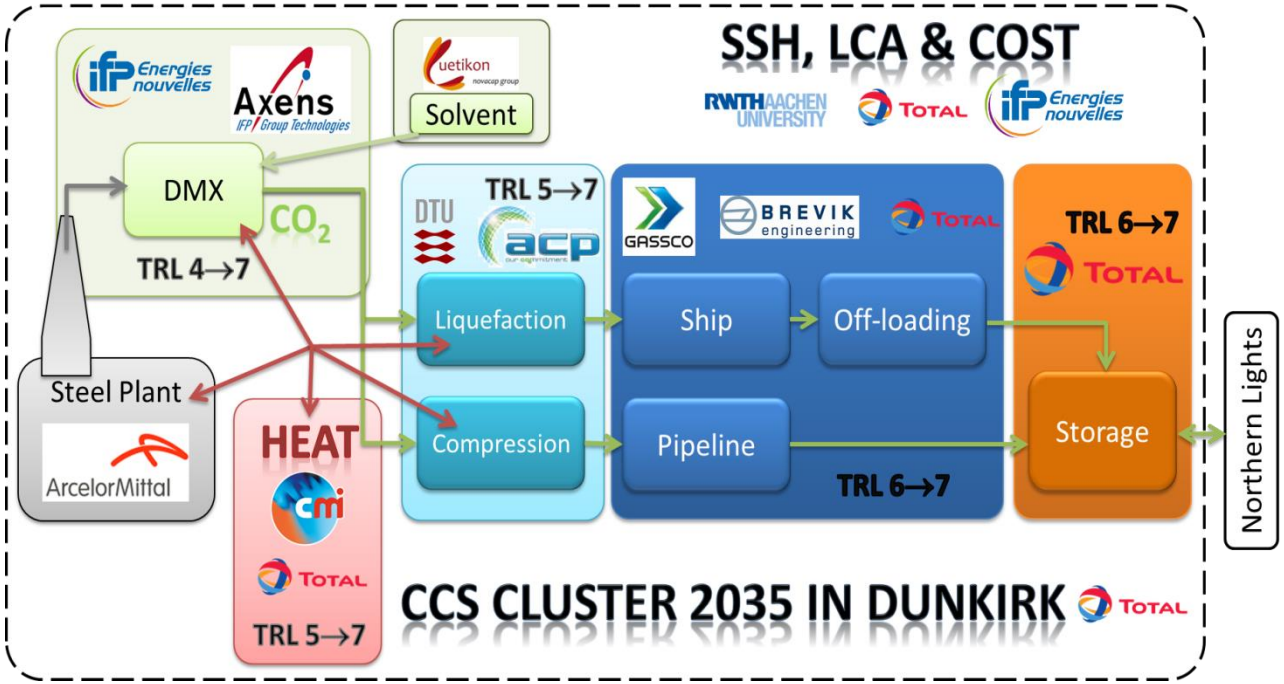
3D project





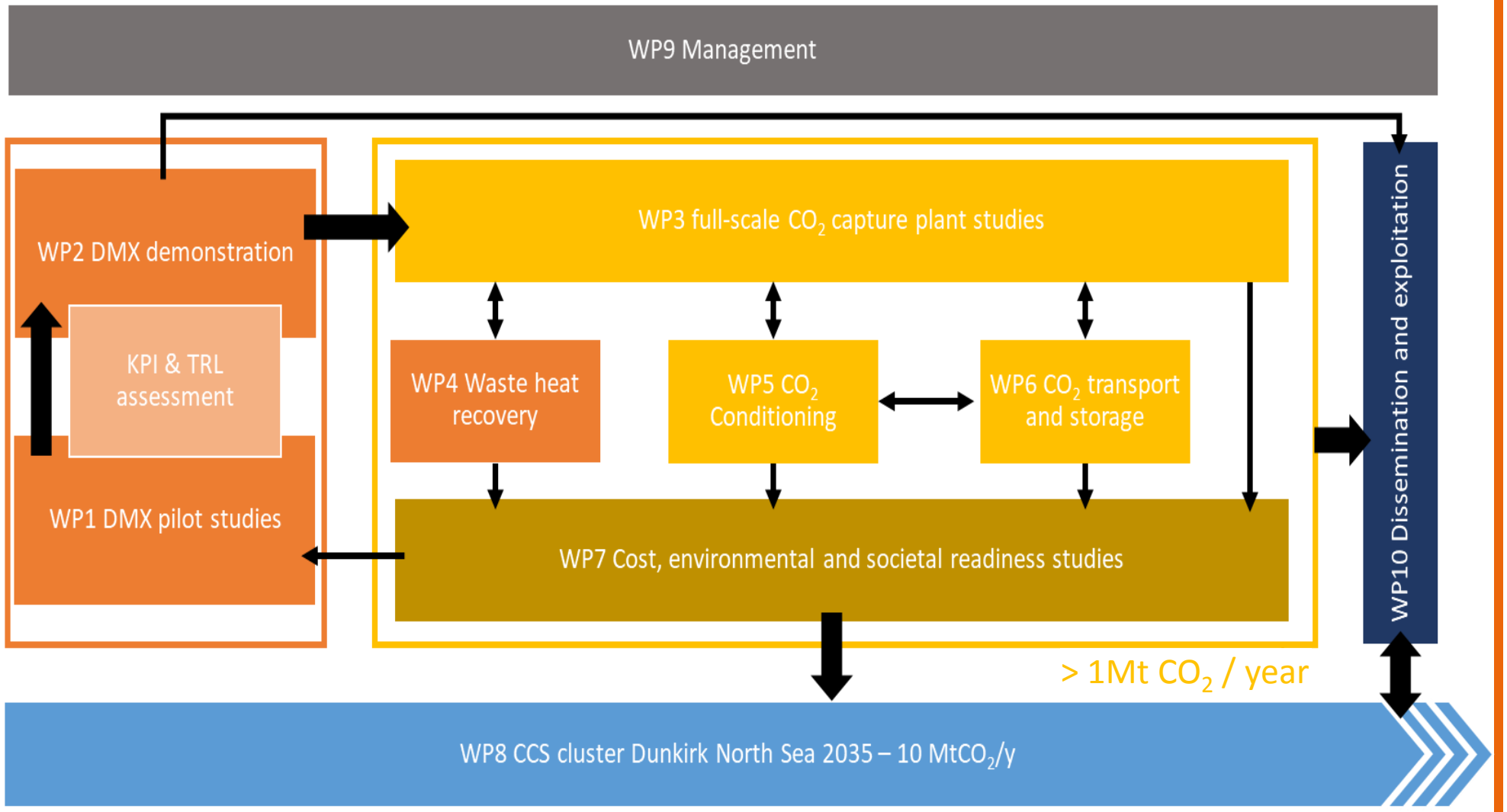
3D objectives

- Demonstrate the DMX™ Process
- Prepare a first CCS large-scale demonstrator (> 1MtCO_2/y)
- Study the CCS cluster 2035 Dunkirk-North Sea (10 MtCO_2/y)

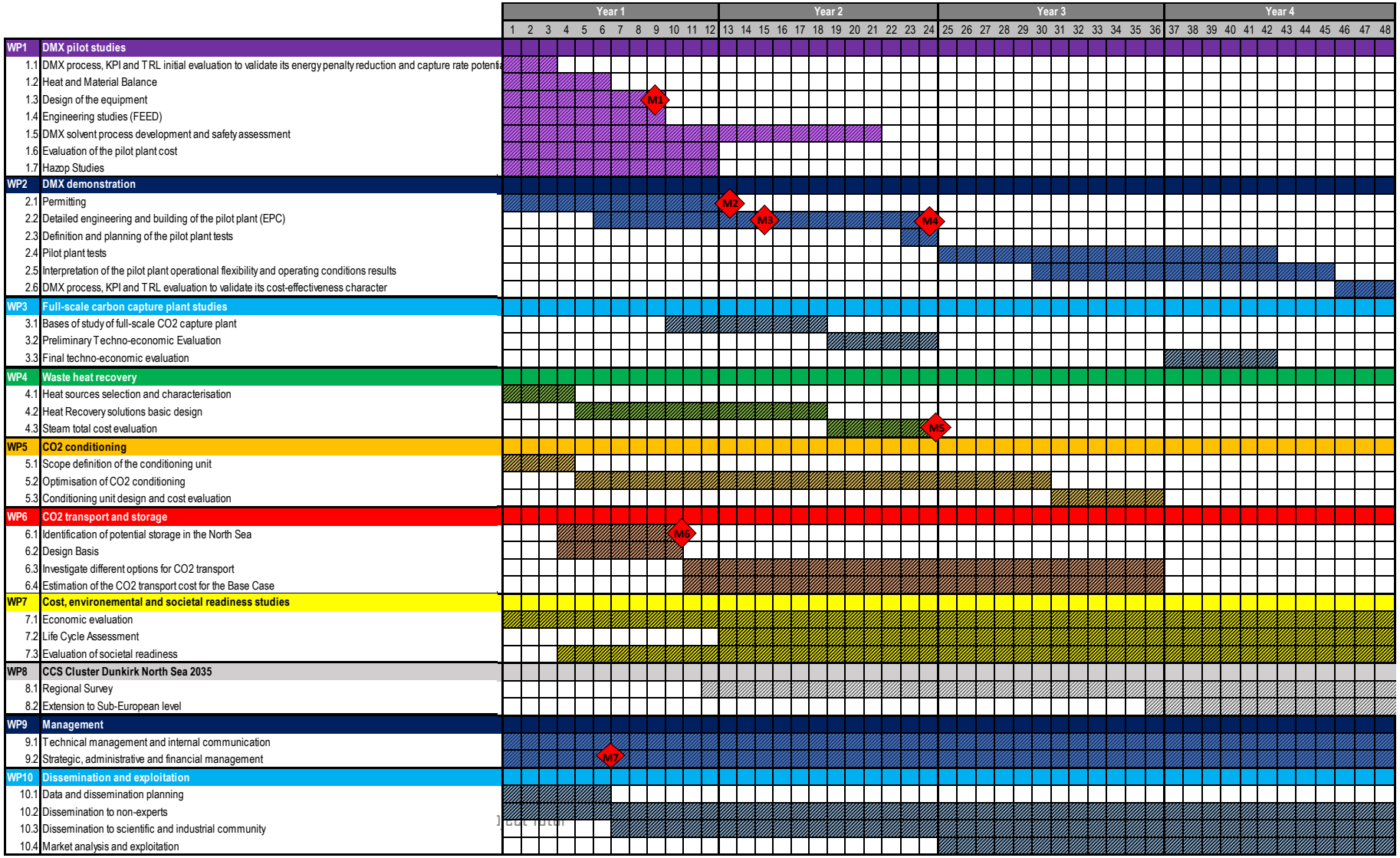


3D workpackages breakdown structure

- 10 Work packages with numerous interfaces



3D Work Plan



CO2 3D DMX DEMONSTRATION DUNKIRK

3D Consortium

Project Number [1]	838031	Project Acronym [2]	3D

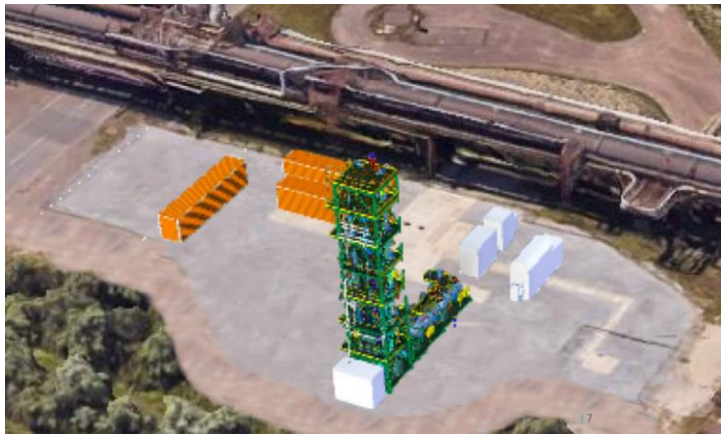
List of Beneficiaries

No	Name	Short name	Country	Project entry month[8]	Project exit month
1	IFP Energies nouvelles	IFPEN	France	1	48
2	ARCELORMITTAL ATLANTIQUE ET LORRAINE SAS	AAL	France	1	48
3	TOTAL RAFFINAGE CHIMIE SA	TOTAL RC	France	1	48
4	AXENS SA	AXENS	France	1	48
5	RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN	RWTH AACHEN	Germany	1	48
6	DANMARKS TEKNISKE UNIVERSITET	DTU	Denmark	1	48
7	ACP POLSKA	ACP Polska	Poland	1	48
8	COCKERILL MAINTENANCE & INGENIERIE	CMI	Belgium	1	48
9	GASSCO AS	GASSCO AS	Norway	1	48
10	BREVIK ENGINEERING AS	Brevik Eng AS	Norway	1	48
11	CU CHEMIE UETIKON GMBH	Uetikon GmbH	Germany	1	48

DMX pilot Plant

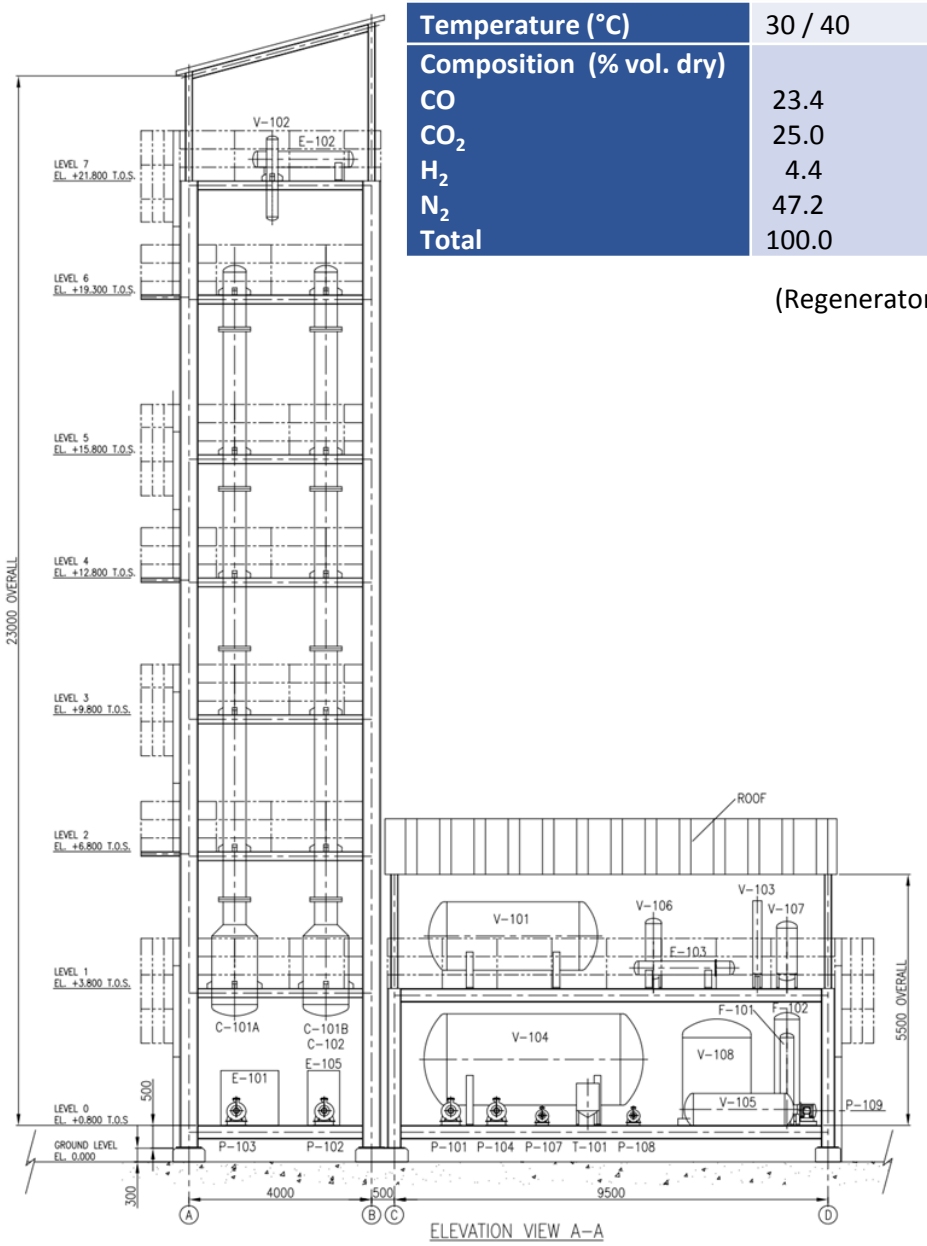
Capacity = 0.5 tCO_2 captured/hour

Future location of the DMX pilot to be built @ ArcelorMittal steel mill in Dunkirk



Capacity (tCO_2 capture/h)	0.5
Raw gas pressure (barg)	0.082 up to 3 (after compression)
Temperature (°C)	30 / 40
Composition (% vol. dry)	
CO	23.4
CO_2	25.0
H_2	4.4
N_2	47.2
Total	100.0

(Regenerator up to 6 bars)



Acknowledgement

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 838031.

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COMMENT MACRON A CAPTÉ L'ÉLECTORAT DE DROITE
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Scor-Covéa : la Banque de France veut un armistice
A Dunkerque, Arcelor veut prélever le CO2 à la source


QUESTIONS