



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

Maxime Lacroix\*, Paul Broutin, Samuel Lethier, David Nevicato, Bernard Petetin, Eric De Coninck, Xavier Courtial,

TOTAL, IFP Energies Nouvelles, ArcelorMittal, Axens

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Trondheim

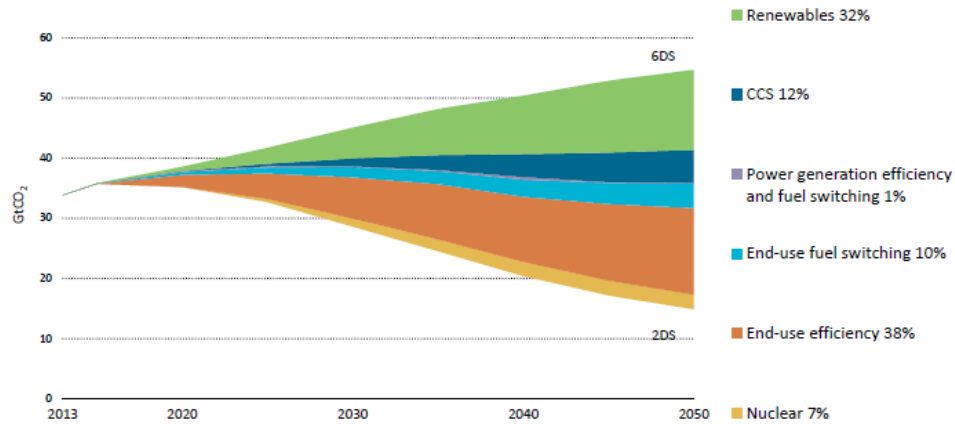
TCCS-10

# Outline

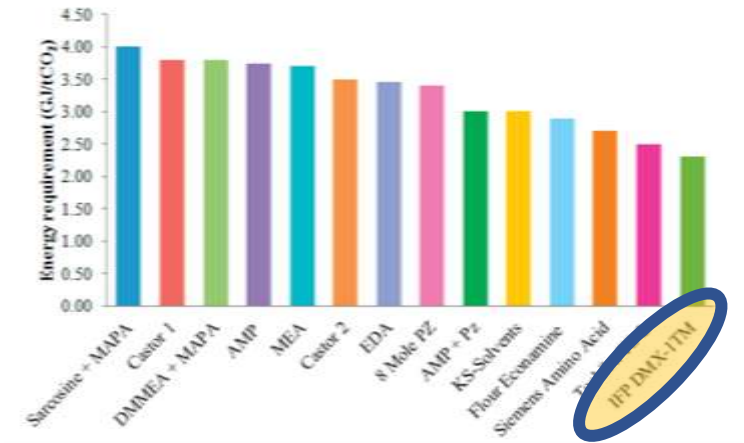
- Context
- 3D project in a nutshell and DMX technology
- Consortium
- Objectives
- Workplan

# Context : GHG Mitigation

CCS in Industry is to deliver 12 % of CO<sub>2</sub> emission cuts by 2050 in IEA 2DS

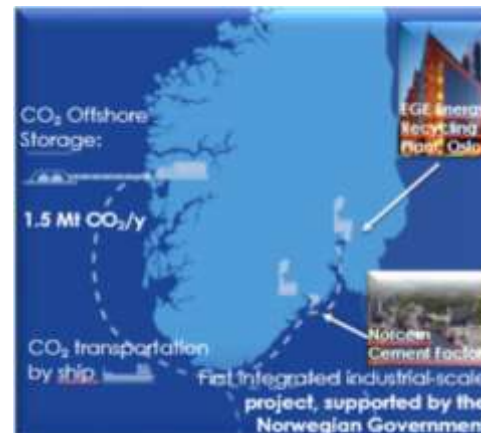


than 1.2 in 2030, only reachable via CCS



Singh P. (IEAGHG), Van Swaaij W., Brilman D.,  
Energy Efficient Solvents for CO<sub>2</sub> Absorption from Flue Gas:  
Vapor Liquid Equilibrium and Pilot Plant Study,  
Energy Procedia 37 (2013) 2021-2046, Oral présentation ,  
GHGT-11, Kyoto, 2012.

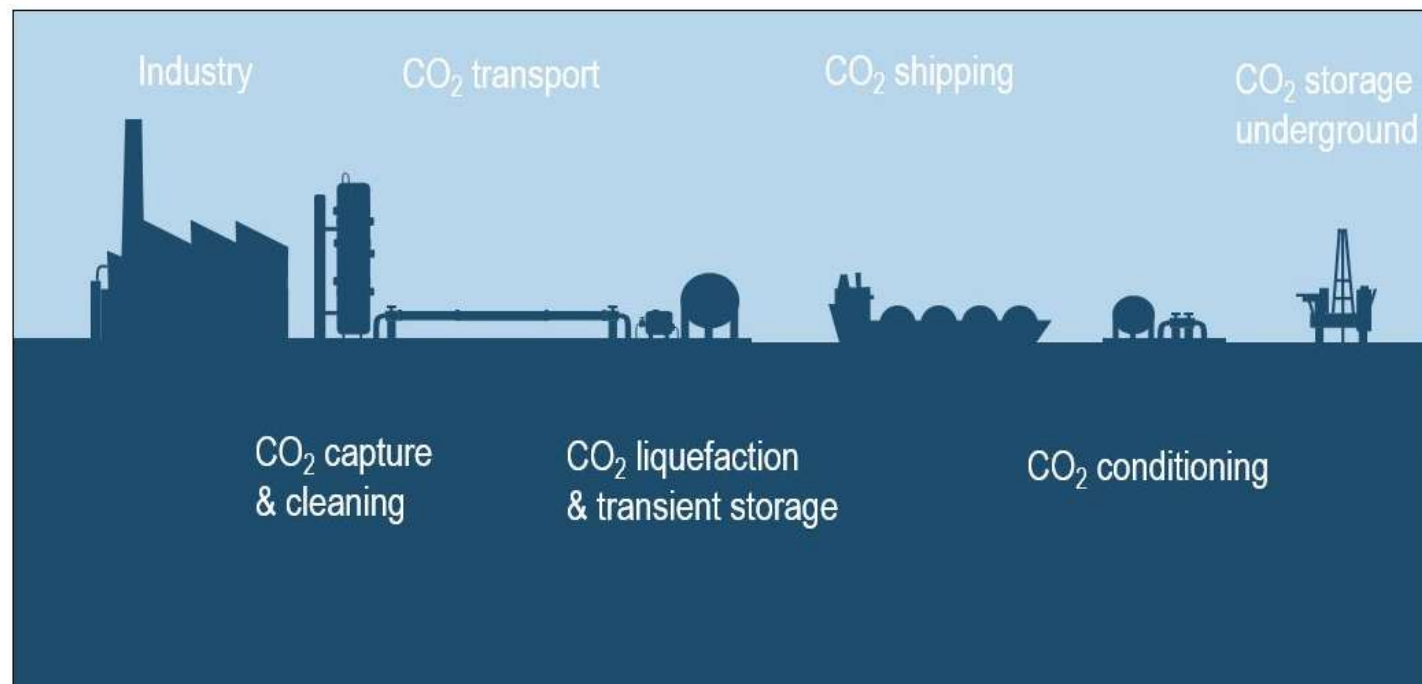
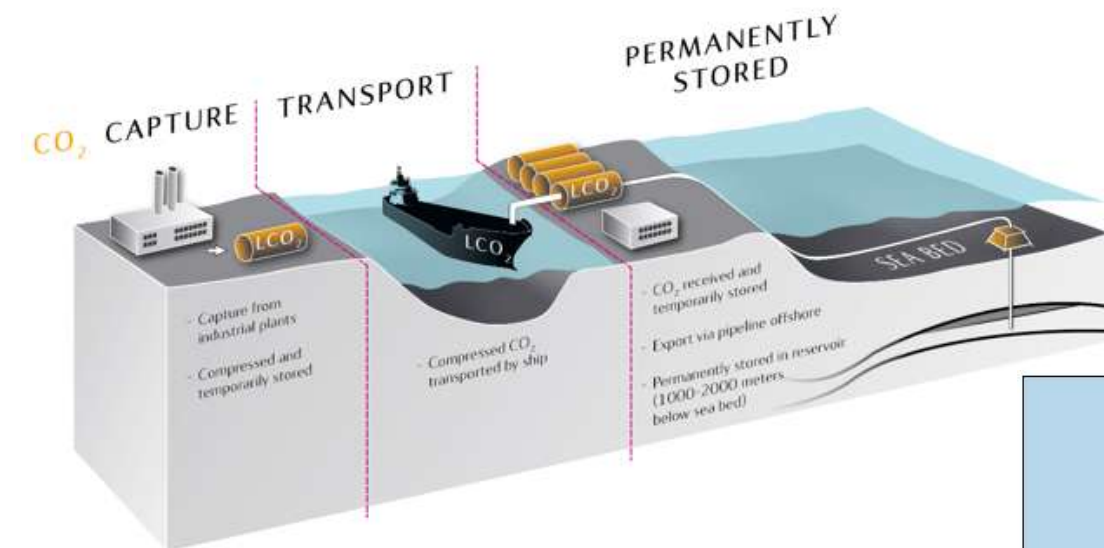
Norwegian project Northern Lights



## 3D in a nutshell

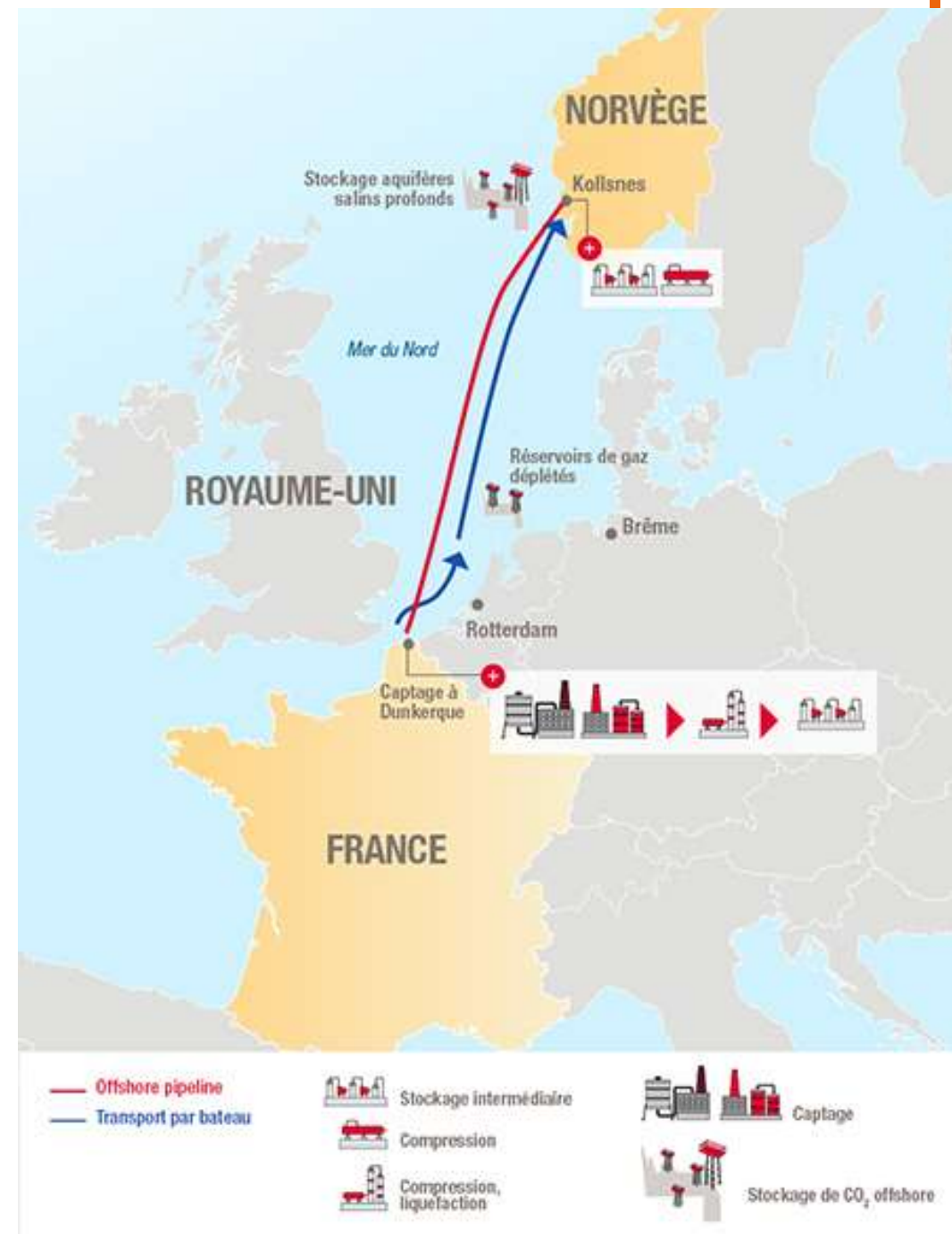
- **DMX Demonstration in Dunkirk**
- H2020 project (call 2018 / topic LC-SC3-NZE-1)
- Project start-up : 01/05/2019
- Duration : 48 months
- Estimated eligible costs : 19,2 M€
- EU funding : 14,7 M€

## 3D over the whole CCS value chain



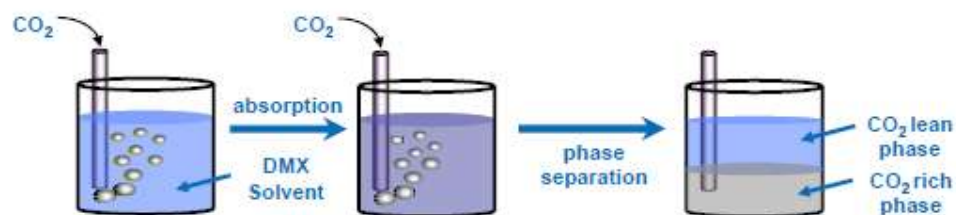
## 3D over the whole CCS value chain

- Dunkirk is the largest CO<sub>2</sub> 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<sub>2</sub> conditioning, transport and storage
- The Cluster approach will be investigated
  - Build a future CO<sub>2</sub> hub around Dunkirk with facilities

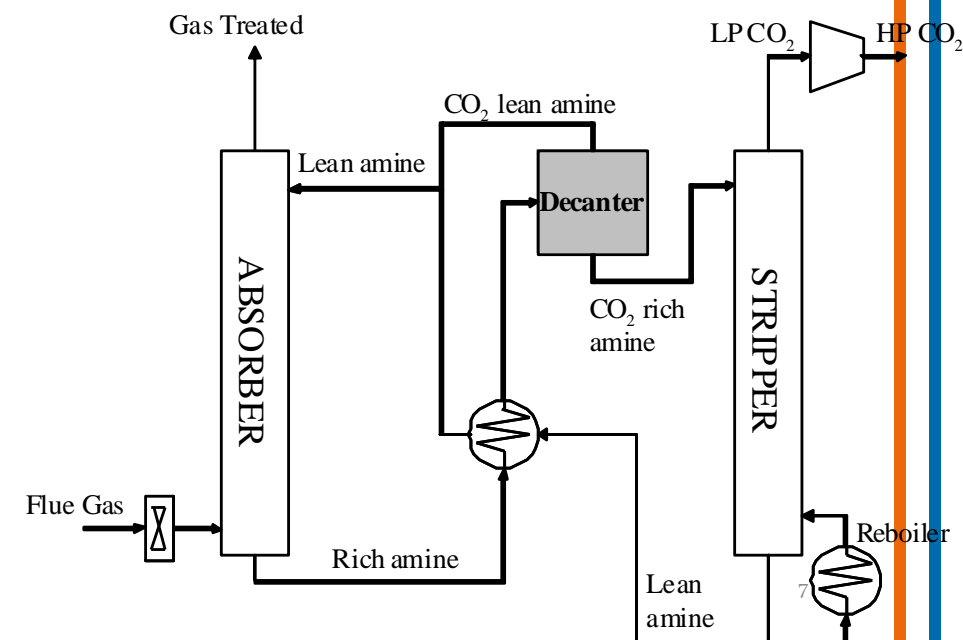


# DMX technology

- DMX technology is based on the principle of a specifically designed solvent, that forms two phases when contacted with  $\text{CO}_2$
- The two phases can be separated and only the  $\text{CO}_2$ -rich phase is regenerated : energy intensity of C-capture is reduced by 30%



- 1) High capacity solvent (4 times MEA)
- 2) Regeneration of the  $\text{CO}_2$  rich phase only
- 3) Solvent very stable  $\rightarrow$   $\text{CO}_2$  produced in Pressure



# DMX technology development

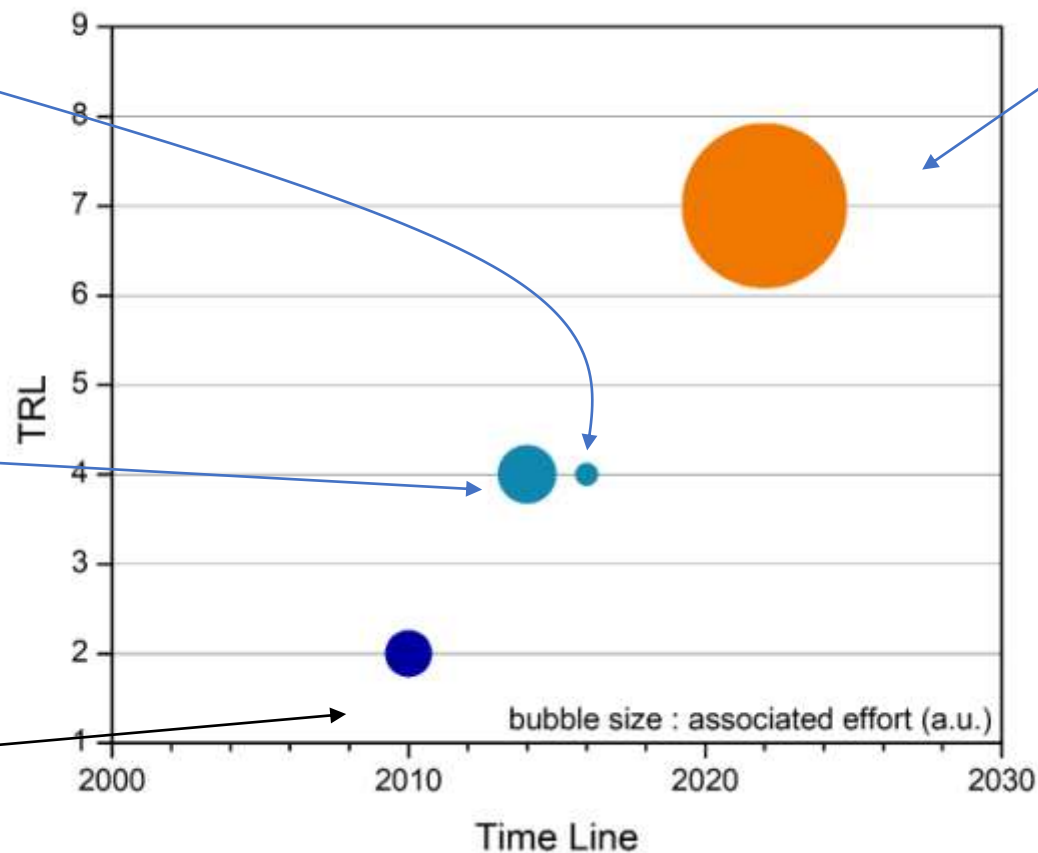


VALORCO project  
(steel mill case)

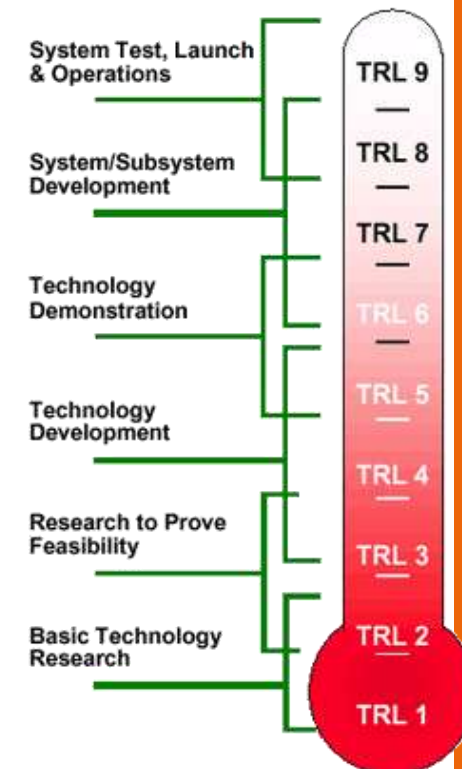


OCTAVIUS  
(coal case)

Lab tests @ IFPEN



3D project

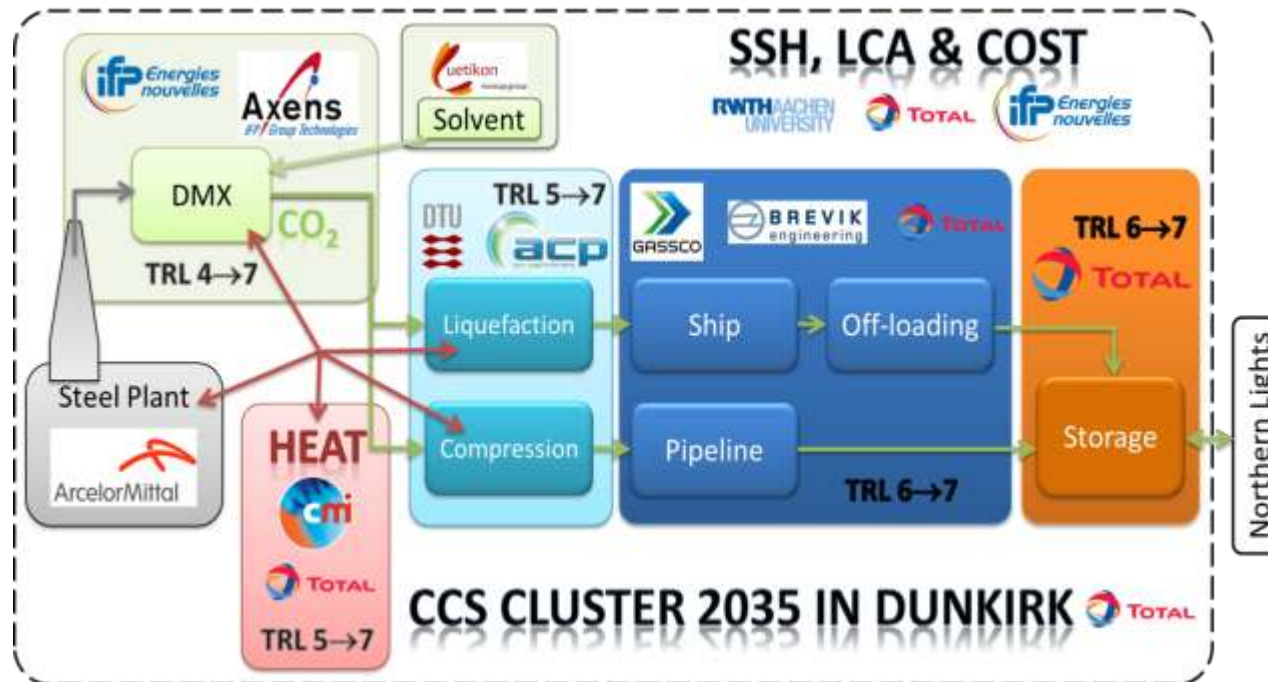


3D project Total



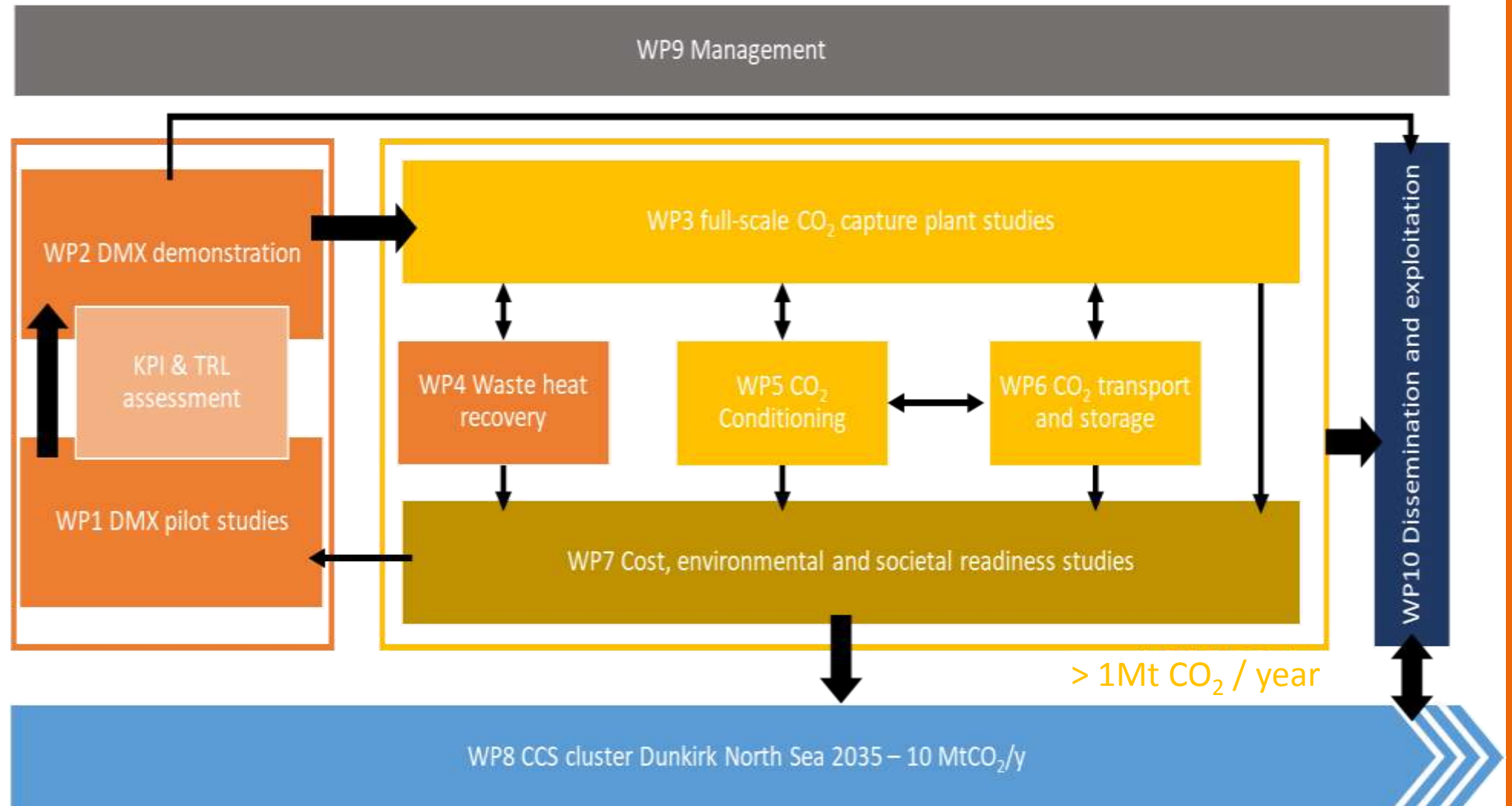
## 3D objectives

- Demonstrate the DMX<sup>TM</sup> Process
- Prepare a first CCS large-scale demonstrator ( $> 1\text{MtCO}_2/\text{y}$ )
- Study the CCS cluster 2035 Dunkirk-North Sea ( $10\text{ MtCO}_2/\text{y}$ )

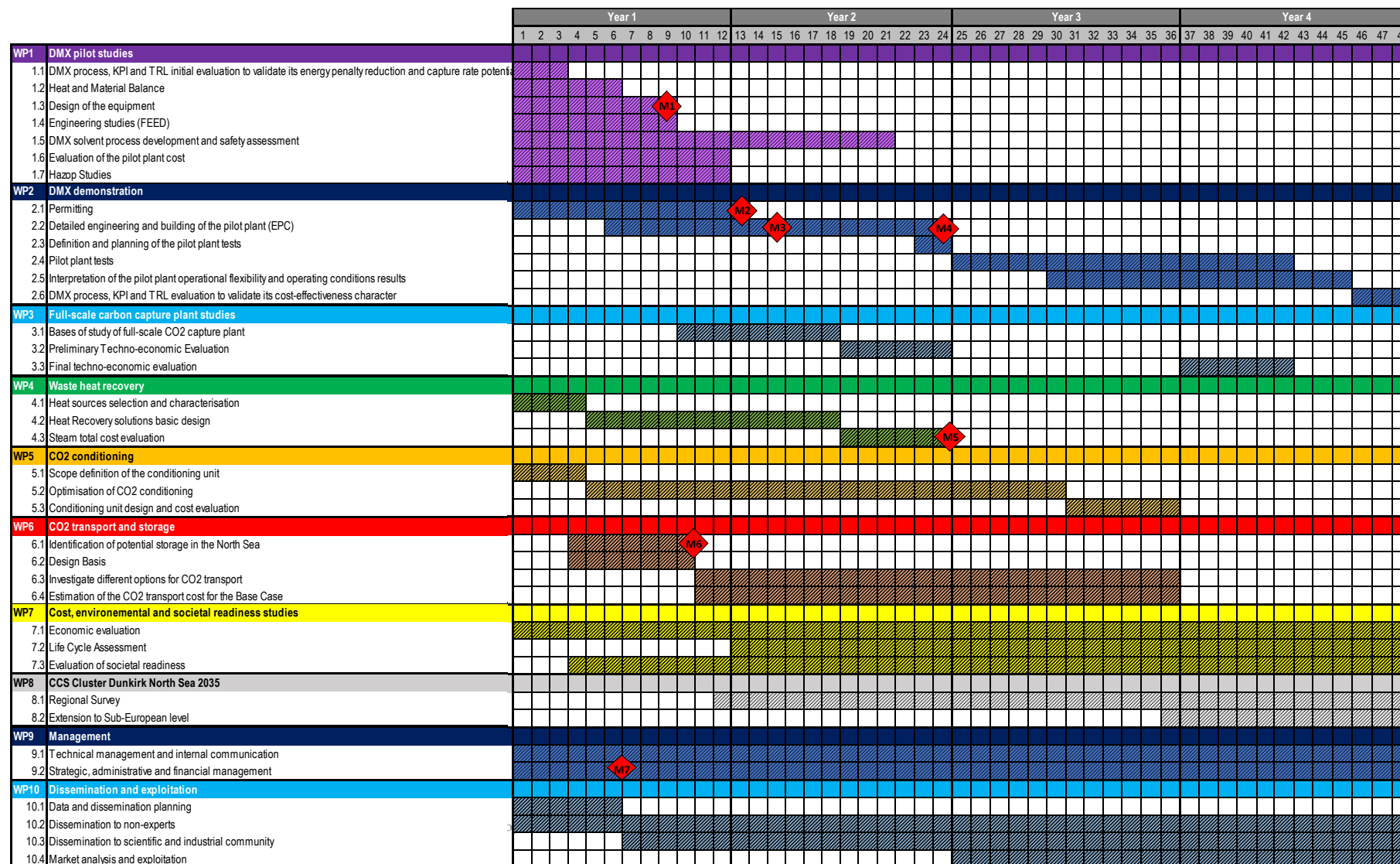


## 3D workpackages breakdown structure

10 Work packages with numerous interfaces



# 3D Work Plan



# 3D Consortium



Project Number <sup>1</sup>	838031	Project Acronym <sup>2</sup>	3D
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## List of Beneficiaries

No	Name	Short name	Country	Project entry month <sup>8</sup>	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

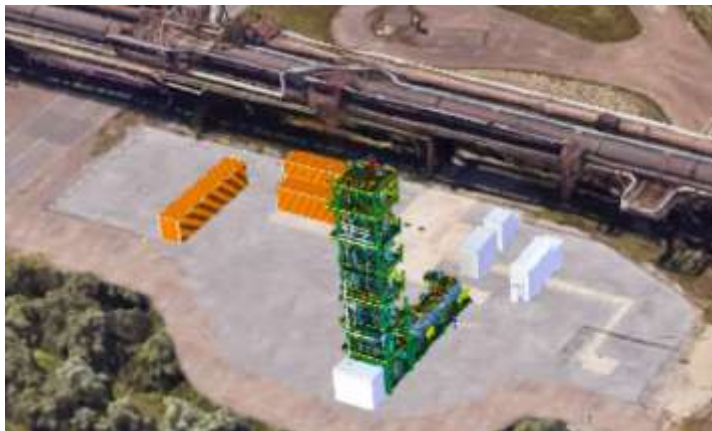


# DMX pilot Plant

Capacity = 0.5 tCO<sub>2</sub> captured/hour

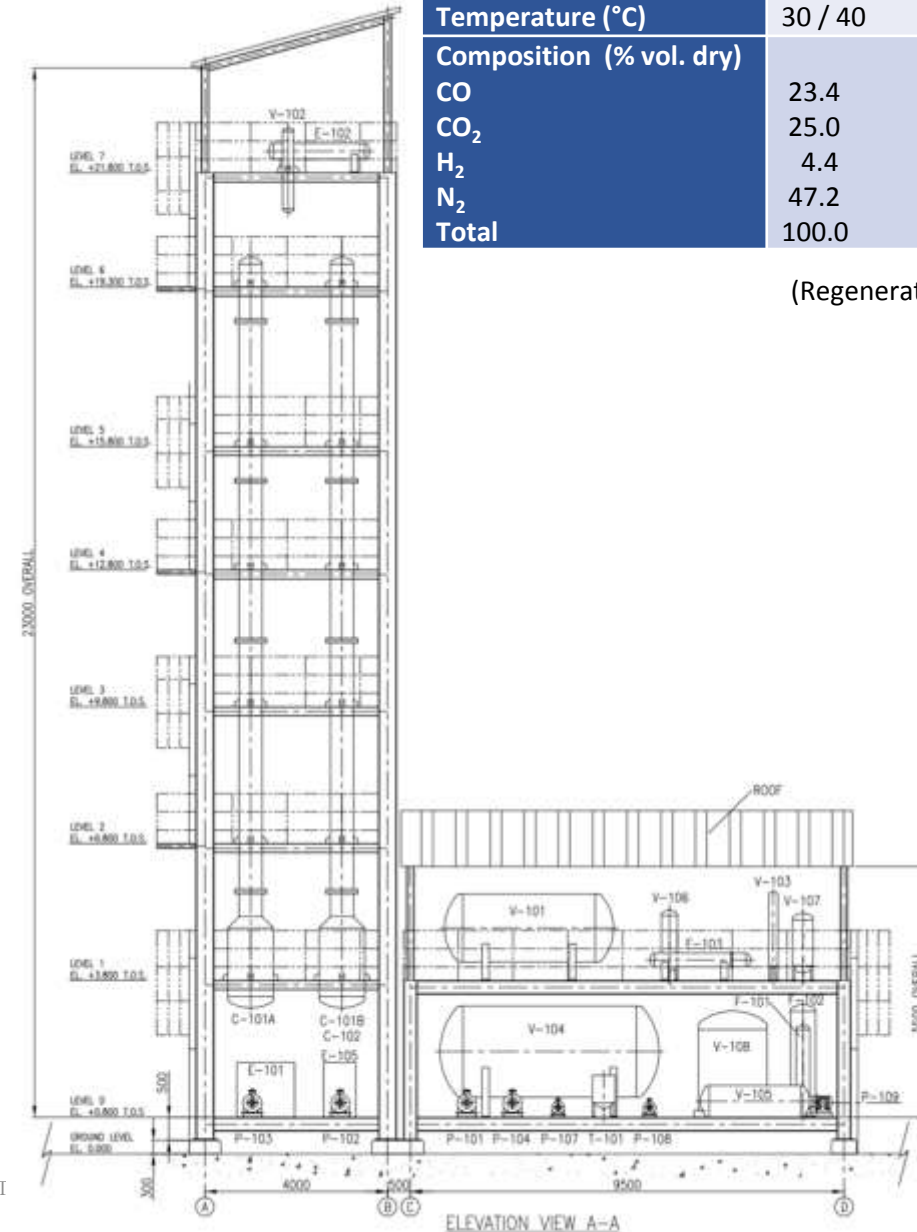


Future location of the DMX pilot to be built  
@ ArcelorMittal steel mill in Dunkirk



Capacity (tCO <sub>2</sub> 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 <sub>2</sub>	25.0
H <sub>2</sub>	4.4
N <sub>2</sub>	47.2
Total	100.0

(Regenerator up to 6 bars)



3D project T

# Acknowledgement

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# Contact

LACROIX – Total Refining & Chemicals

[maxime.lacroix@total.com](mailto:maxime.lacroix@total.com)

Phone +33 2 35 55 14 41



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In the press



QUESTIONS

