

November 14th, 2023
Brussels, Belgium



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PUBLIC PERCEPTION AND BUSINESS MODELS JOINT EVENT

Organised by the Carbon Capture,
Utilisation and Storage (CCUS) &
Alternative Fuels Horizon 2020/
Horizon Europe CLUSTER projects

Supported by CINEA - European Climate,
Infrastructure and Environment Executive Agency

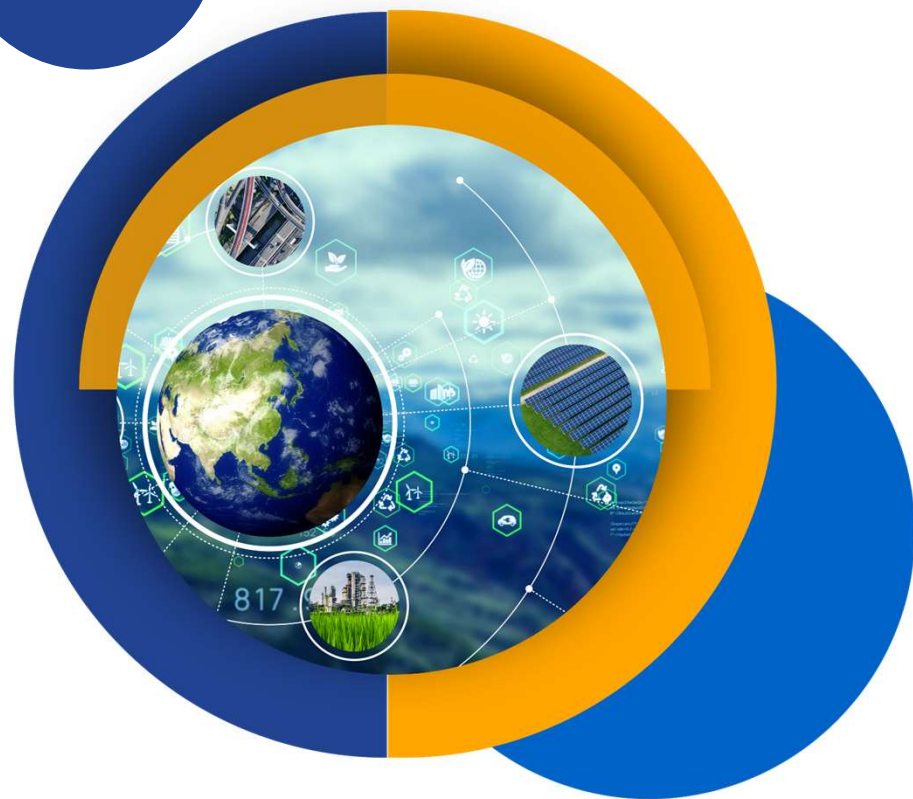
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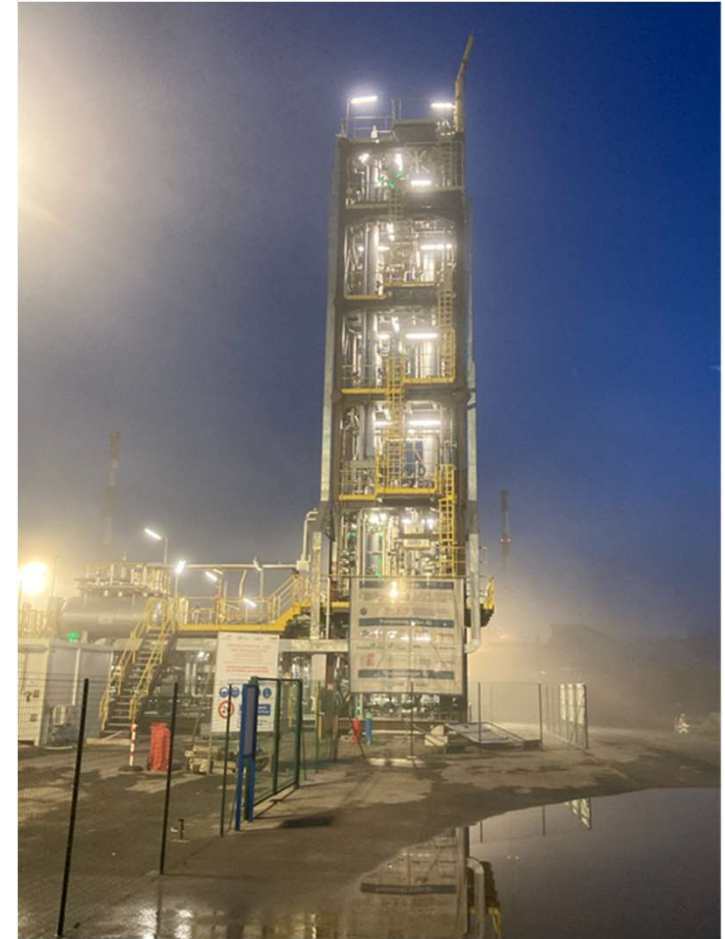
Business Model

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3D project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 838031.

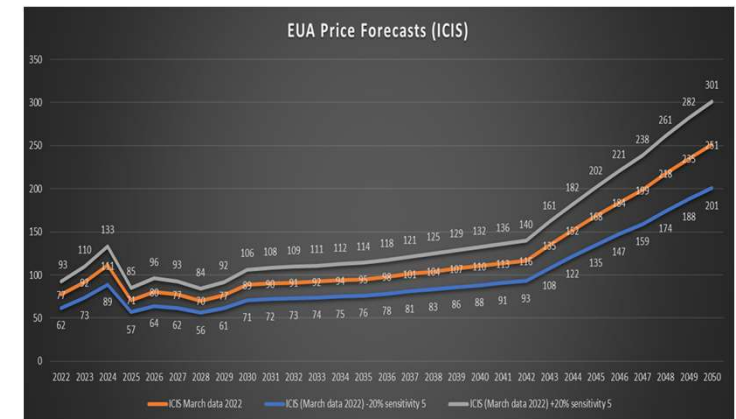
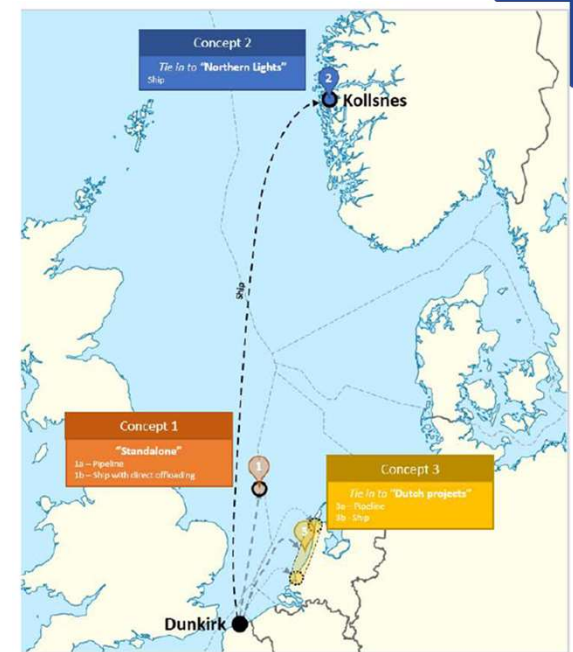
Baseline

- The European steel industry objectives : to cut carbon emissions by 55% by 2030 compared to 1990 levels and to achieve climate neutrality by 2050.
- The 3D project :
 - aims to prove that CO₂ capture technology DMX™ can be operated successfully in connection with a blast furnace gas from a steel plant.
 - objective is to develop and demonstrate technologies to TRL 7 in a complete value chain of Carbon Capture and Storage.
- Investing in CCS technologies involves significant economic risks like:
 - Uncertainties on price forecasts : energy price, European Union Allowances (EUAs),
 - Applicability of the Cross Border Adjustment Mechanism (CBAM) to European steel industry
- The gap in legislation affecting economic roll out:
 - A Monitoring Reporting and Validation (MRV) methodology for the full CCS chain on regulatory and voluntary carbon markets to certify avoided emissions.
 - Need a clear CO₂ transboundary regulation to fully recognise the contribution of these transboundary storage activities within national and international accounting and crediting schemes (London Protocol)
 - Art. 6 Paris Agreement to support the transboundary transportation of CO₂ for the purposes of geological storage.



Methodology

- Main assumptions :
 - DMX™ is capturing from Blast Furnace n°4 in Dunkirk 1 Mt/year of CO2 and studying 3 concepts of transport and offshore storage in North Sea
 - 20-years lifetime project
 - Transport and storage are a service purchased by 3D project (and so considered as operating cost)
 - EUAs : ICIS CO2 - Long term forecast (Independent Commodity Intelligence Services. 80€ in 2026 - 184 €/tCO2 in 2046)
- The economic analysis is conducted with
 - CO2 capture facilities are eligible for the Innovation Fund rules
 - The economic analysis of 3D DMX™ Demonstration in Dunkirk is being carried out under the IF rules - call 3 December 2022.



Results

- Time horizon validity of the study is 2025-2045
- The final cost estimation of 3D project (CAPEX and OPEX) is expected end 2024
- Transport and storage is tested at 70€/tCO₂ transported and stored (purchased service)
- At very first glance (need to be fixed in 2024): around 20% of total costs are due to capital expenditure, 80 % of total costs are due to operating costs. Impact of the Transport and storage operation costs of 3D CCS chain.
- The critical assumptions that could totally change the economics seems to be :
 - Innovation Fund Grant
 - Future European inflation rate,
 - Energy price,
 - Opex costs and in our case the Transport & storage (operating) cost,
 - EUAs forecast price,
 - Additional premium price for decarbonated HRC (Hot Rolled Coil),
 - Decline of the free allowances and the implementation of the Cross Border Adjustment Mechanism (from 2026)



Stakeholder impact

To secure the future deployment of CCS in Europe it's needed to

- facilitate an open-access transport network at European scale
- secure / foster storage capacities for European / national industries
- Secure a relative high EUAs forecast price
- agreement London Protocol transboundary CO2 transport
- secure Innovation Fund for Capex and Opex of CCS projects
- control the effects of the CBAM on European steel industry

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Thank You

For Your Attention

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