

**Energy**

# IFPEN's DMX™ technology: Decarbonisation of CO<sub>2</sub>-Intensive Industries



**The DMX™ Technology:** An advanced **post-combustion carbon capture process** developed by IFPEN and commercialised by Axens **to significantly reduce CO<sub>2</sub> emissions from industrial sources**



**RTO - Industry collaboration:** From **lab-scale development** to a successful **industrial demonstration** at ArcelorMittal's steel mill in Dunkirk, the world's leading steel and mining company. The **DMX™ process is ready to be commercialized in 2025**



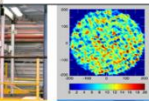
**Towards a Sustainable Industry:** **CO<sub>2</sub> capture and storage (CCS) technologies are identified by the EU as crucial to achieve COP21 objectives.** According to the IEA, CCS technologies are set to account for 9% of the CO<sub>2</sub> emission reductions required by 2050 in order to reduce global warming to 2°C by 2100

**This technology works by absorbing CO<sub>2</sub> from flue gas using an innovative demixing solvent.** This solvent's unique properties, combined with smart process integration, result in **minimal energy consumption**. Additionally, the DMX solvent has excellent resistance to degradation, **reducing maintenance and operating costs over time**. The process produces highly pure CO<sub>2</sub> (>99.9%), which can be used for either **permanent storage or other industrial applications**

Solvent screening



Cold-flow prototype  
CFD simulations



Process modelling  
Thermodynamics, kinetics,  
physicochemical  
properties...

Laboratory scale  
IFPEN projects  
(2010)

Pilot scale  
0.2 kg CO<sub>2</sub>/h  
OCTAVIUS  
VALORCO  
(2012-2016)



Industrial  
demonstration scale  
0.5 tCO<sub>2</sub>/h  
3D - Today



**IFPEN  
Technology**

**EU RD&I Collaborative  
Projects  
&  
Industrial Partnerships**

**Technology Transferred to  
Axens to support the  
decarbonisation of CO<sub>2</sub>-  
intensive industries**

**Axens**  
Powering integrated solutions

# IFPEN's DMX™ technology: From Lab to Fab

## EU RD&I Collaborative Project

The **OCTAVIUS** project, coordinated by IFPEN and gathering 16 participants, aimed to demonstrate integrated concepts for zero-emission power plants

## EU Demonstration Project in Collaboration with Industry

The "3D" (**DMX Demonstration in Dunkirk**) H2020 EU project (€14.8 million) developed a large-scale industrial demonstration at ArcelorMittal's steel mill in Dunkirk (0.5 tCO<sub>2</sub>/h)

## Market Deployment by Axens

The DMX technology is commercialised by Axens and is now ready for market deployment, targeting primarily hard-to-abate industrial emissions

15 Years of Tech Maturation

EU & Worldwide Market Expansion

2010

2012 - 2017

2014 - 2018

2020

2024

2025

### lab-scale experiments

The DMX technology developed by IFPEN is an **advanced post-combustion carbon capture** process aimed at reducing industrial CO<sub>2</sub> emissions

### National collaborative Project

The **VALORCO** project, coordinated by ArcelorMittal, aimed to **reduce the steel industry's carbon footprint** by minimising and utilising CO<sub>2</sub> emissions

### 1<sup>st</sup> Industrial Unit

The 3D project also prepared the future construction of a **larger industrial unit capable of capturing 1 million tons of CO<sub>2</sub> annually by 2028 (125 tCO<sub>2</sub>/hour)**

"After 15 years of development of this innovative technology at IFPEN from proof of concept through to the laboratory, we're proud to have demonstrated the performance of the DMX™ process for an industrial gas flow. It's all thanks to intensive teamwork, conducted with our partners since the launch of the 3D project back in May 2019. And it represents an important step towards the decarbonisation of industry in France and around the world."

Vania Santos-Moreau, 3D project manager

## Sustainable Development

DMX™ technology could potentially **prevent 20 million tons of CO<sub>2</sub> emissions annually** through 30 DMX™ licenses by 2035

8 DECENT WORK AND ECONOMIC GROWTH



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION

