



CO2 issues as a green diversification driver for the port of Marseille Fos & its territory

Club CO2 – Lyon 21/10/2016

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Marseille Fos
Le port euroméditerranéen

The logo for Marseille Fos, featuring the text 'Marseille Fos' in a bold, sans-serif font, with 'Le port euroméditerranéen' in a smaller font below it. To the right of the text is a stylized graphic of three white arrows pointing upwards and to the right, set against a dark blue background.

AGENDA

1. Introduction to port of Marseille Fos

2. The CO2 issues as a green diversification driver for economic development

3. Projects under development at MFPA : CO2 reduction / CO2 recycling

1. INTRODUCTION TO PORT OF MARSEILLE FOS

Economic engine for the region

- No 1 port in France - 2nd in the Mediterranean - 5th in Europe – 80 MT traffic
- 1.100 employees, 43.500 direct and indirect jobs
- Main operations: all kinds of goods/cargo; ship repair; passenger, cruise and ferry activities



1. INTRODUCTION TO PORT OF MARSEILLE FOS

Refinery industry Context :

- -20% of traffic since 2008 => -20MT / Losses of added value for the port
- Structural changes for the future

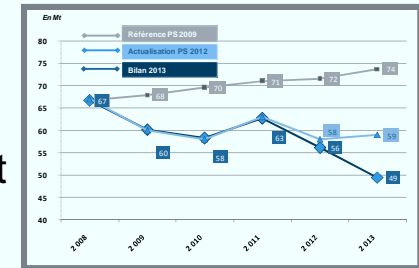
Emergency to :

- Maintain and develop our historical activities,
- Find new sources of growth for the GPMM and its territory

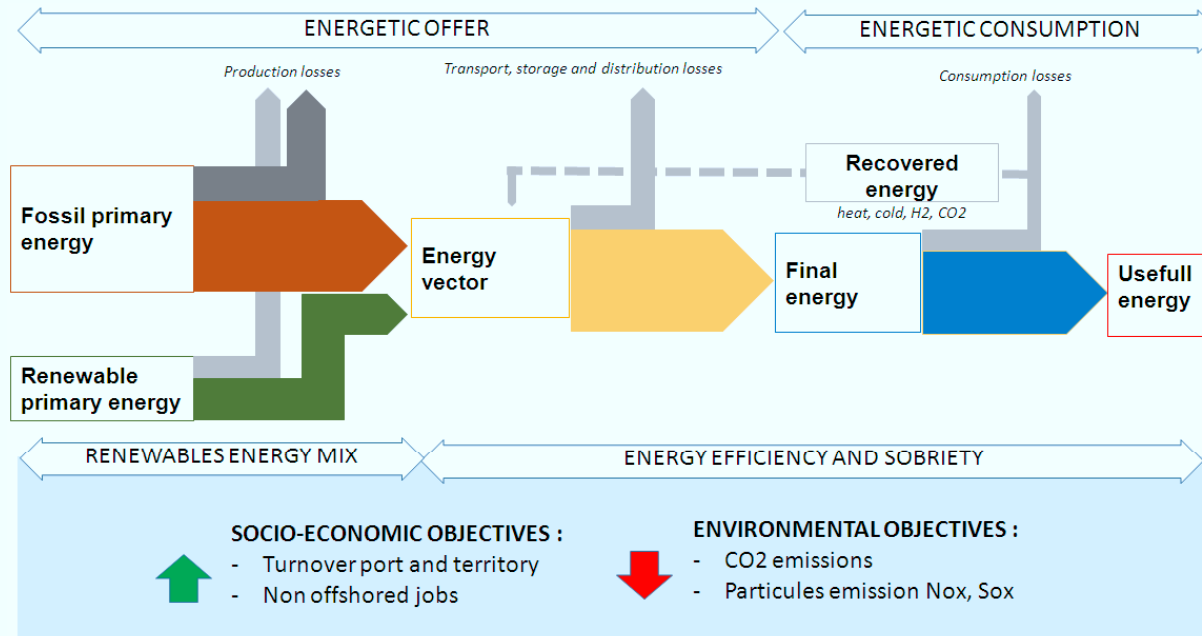
Strategic view of the port:

- Axis 1: The port itself as an architect of logistics and industrial solutions,
- Axis 4: The port supports diversification and energy transition in a territorial cohesion approach, in favor of regional employment

→ **Energy transition as the port's new strategic business engine for diversification and sustainability => CO2 reduction / CO2 valorization and recycling=> 13MT CO2/year on the industrial port zone**



2. THE CO2 ISSUES AS A GREEN DIVERSIFICATION DRIVER



New business opportunities for :

- (1) CO₂ reduction
- (2) CO₂ recycling

Two main guiding principles :

- (1) Energy efficiency and sobriety
- (2) Diversification of the energy mix and developing renewable

2. THE CO2 PLAYING FIELDS FOR GREEN DIVERSIFICATION DRIVER



Study perimeter including:



Port industrial area



Urban area



Agricultural area

Examples related to the urban area:

- Thalassotherapy using seawater for an eco-district
- Supplying utilities or an eco-district via a waste heat network fed by industry in the port area

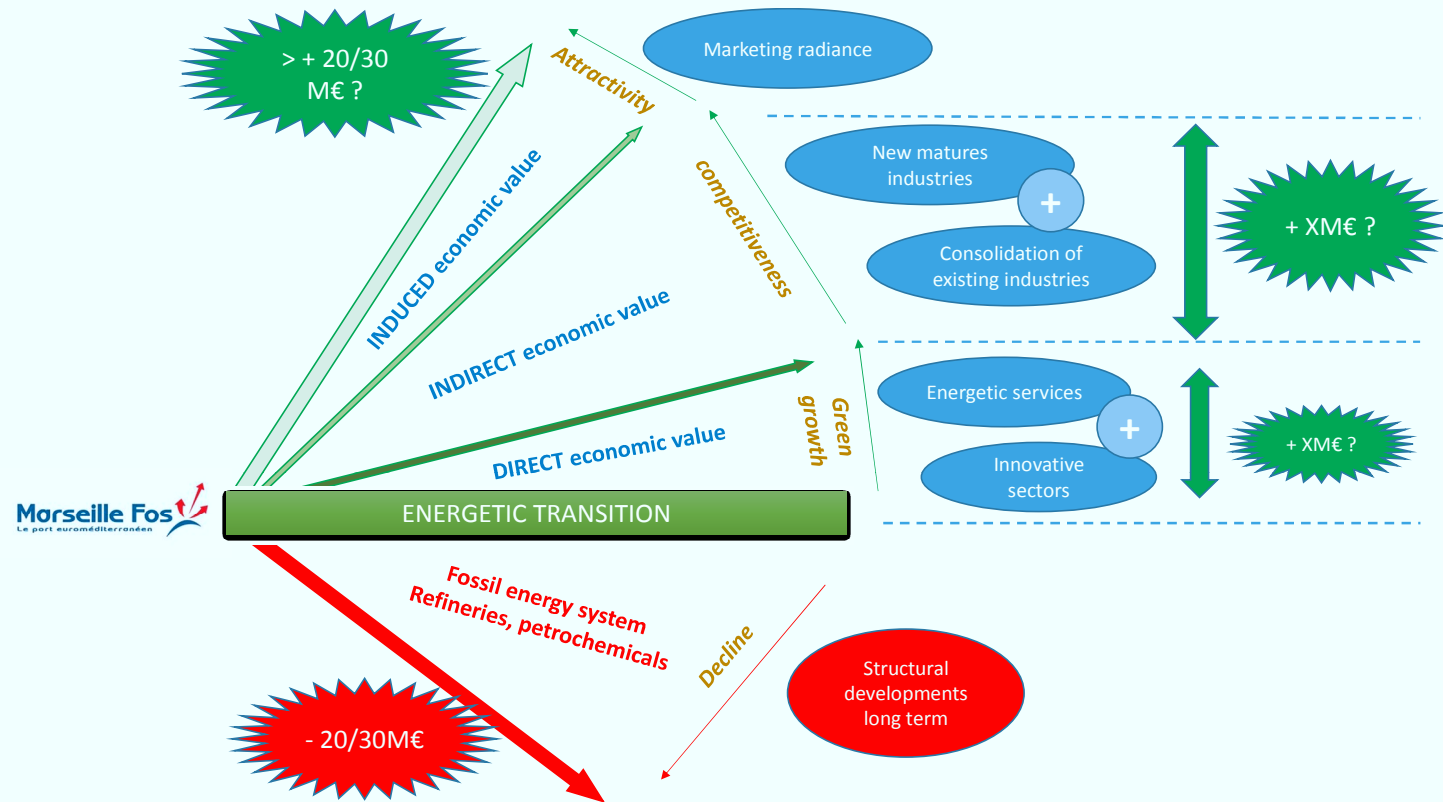
Examples linked to the agricultural area:

- Supplying heat to agricultural greenhouses thanks to a low temperature network from geothermal or industrial sources from the port.
- Supplying seaweed production farm or greenhouses by capturing industrial CO2 from the industrial emissions on the Fos area.

The most relevant “playing field” for energy transition & CO2 recovery in order to develop :

- **(1) Energy services** = energy supply & services => reduced value chain integration
- **(2) New innovative sectors** = maximized value chain integration (industry & logistic)

2. THE CO2 ISSUES AS A VALUE CREATOR FOR THE PORT AND ITS TERRITORY



SOCIO-ECONOMIC OBJECTIVES :

- Turnover port and territory
- Non offshored jobs



ENVIRONMENTAL OBJECTIVES :

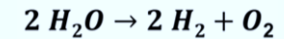
- CO2 emissions
- Particules emission Nox, Sox

3. JUPITER 1000 : example of industrial development for CO2 recycling

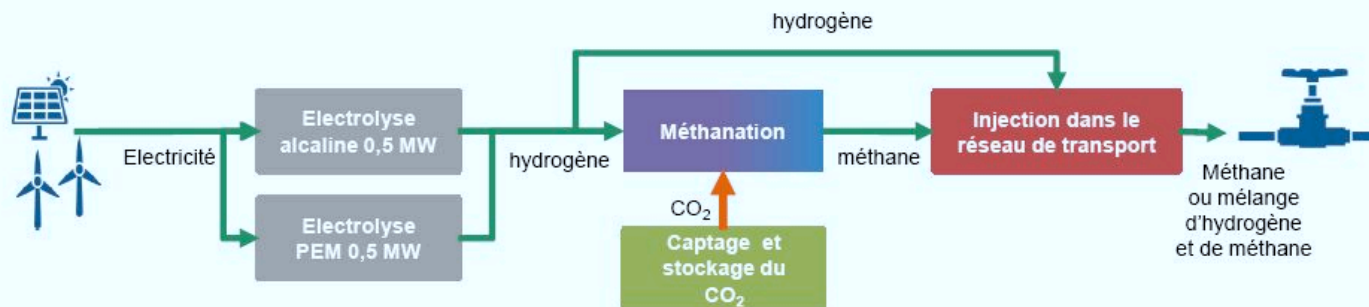
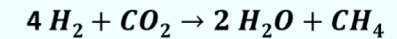
- First demonstrator in France to develop the renewable electricity surplus and recycle industrial CO₂
- The project plans to inject a low hydrogen content (max 6%) in the gas network and test the integration of a methanation stage,
- An operational pilote of 1MW pilot in 2018,
- An evolving industry: electric storage potential surplus of 2.5 TWh in 2030 (=100 power plants of 10MW gas) and more than 1,000 estimated by GRT gaz in 2050,
- A solution for the massive development of renewable energy and recycling of industrial CO₂, across the ZIP and territoire



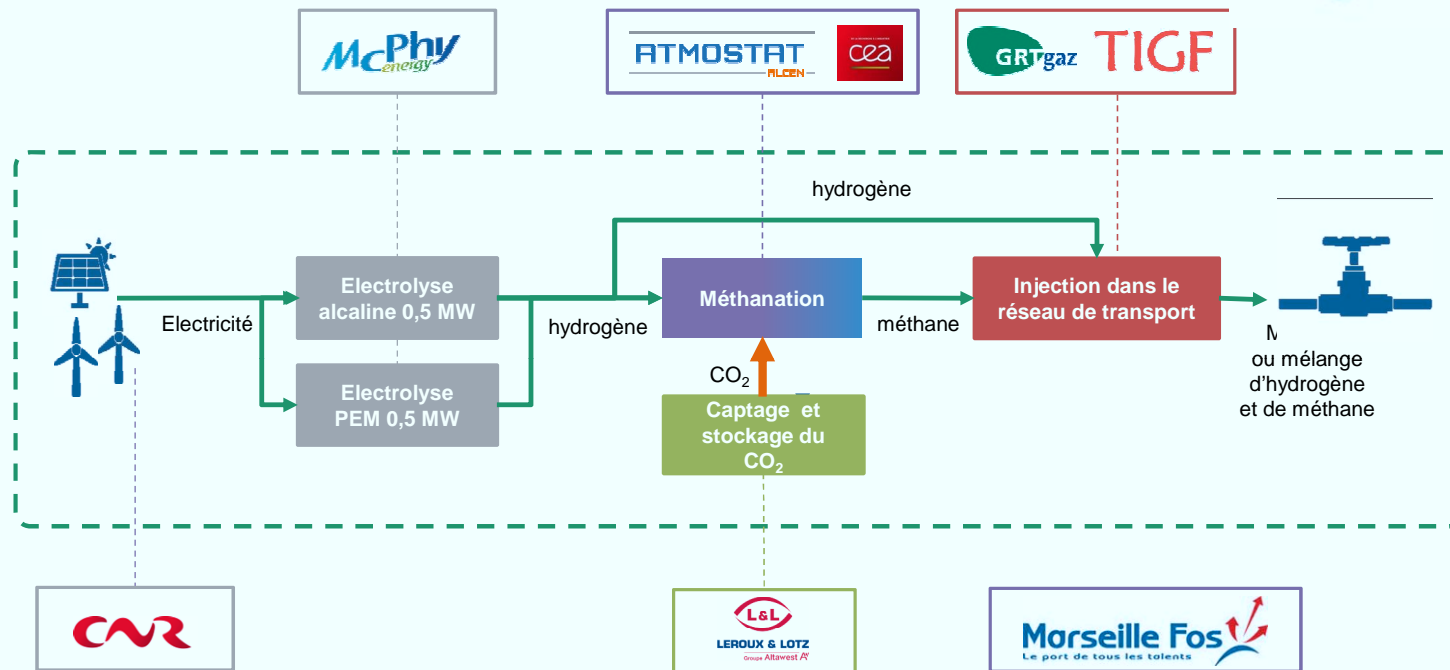
PRODUIRE DE L'HYDROGÈNE PAR ÉLECTROLYSE



AJOUTER LA MÉTHANATION : >> QUANTITÉS

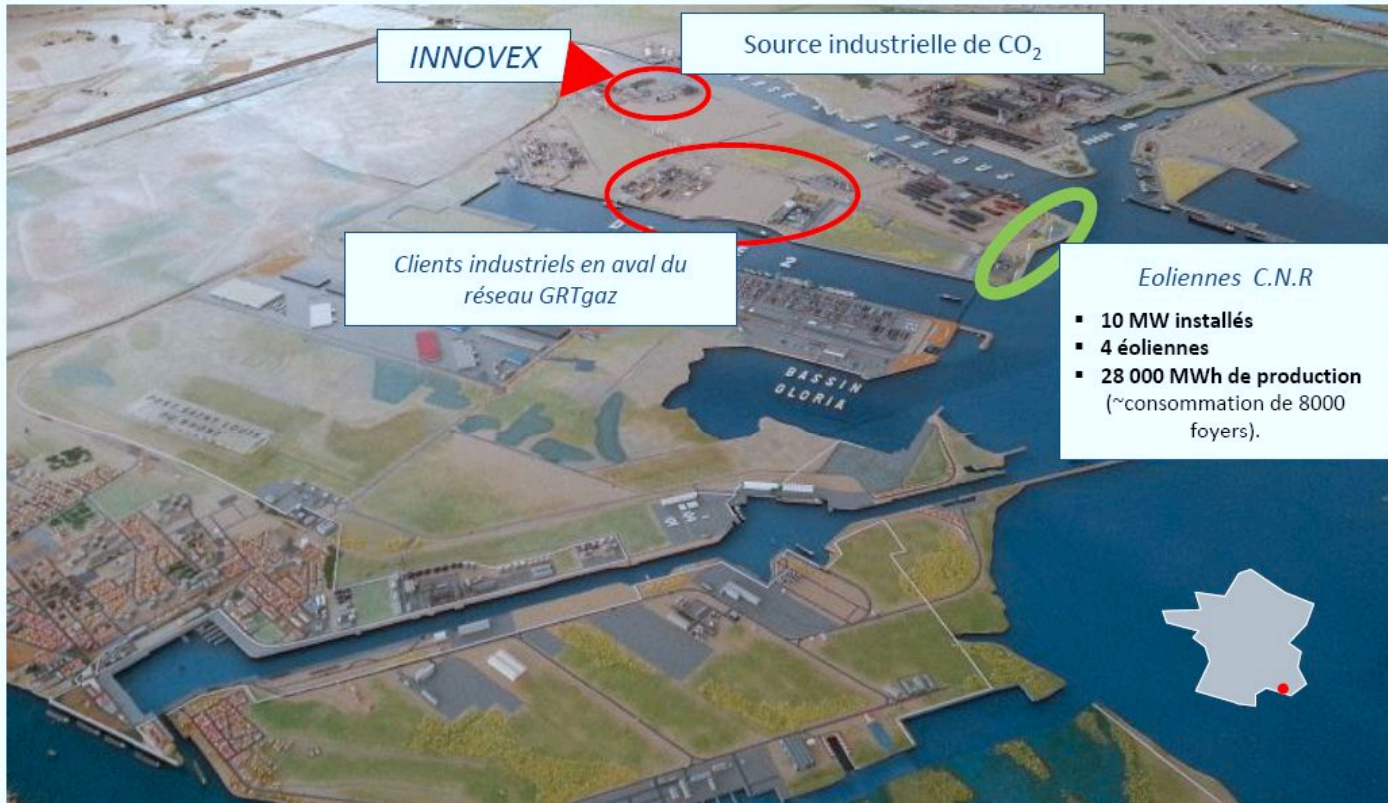


3.The JUPITER 1000 project and its 7 French partners in the power to gas sector ...

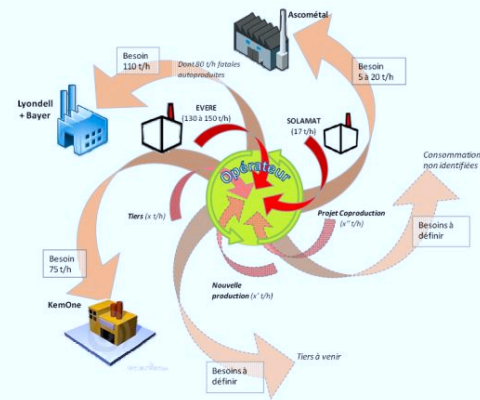


<https://www.youtube.com/watch?v=yYbfbP3gsfo>

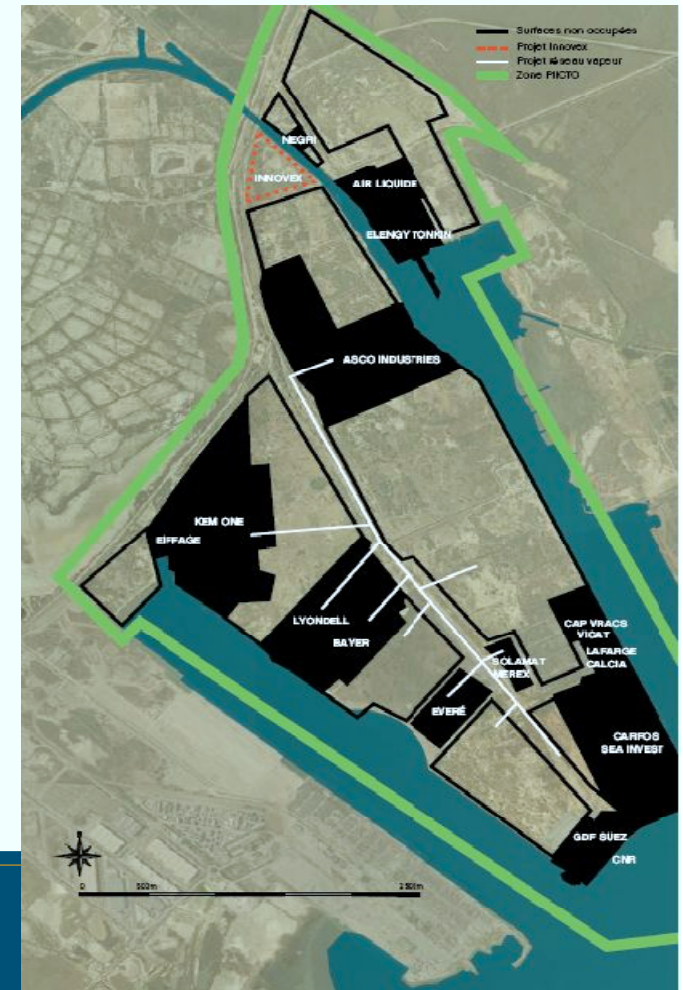
3.The integration of Jupiter 1000 in the industrial ecosystem PIICTO



2. STEAM NETWORK AS A CO2 REDUCER AND A TOOL FOR INDUSTRIAL ATTRACTIVENESS



- Steam network = 31 bar and 300 ° C for a 160 T/h throughput
- Annual exchange of 500 000 tT/y of steam,
- Saving of natural gas = 400 000 MWh / year
- **Avoid 70,000 tons of CO2** emitted each year (a decrease of nearly 20% of global CO2 emissions from the PIICTO platform).
- Create a tool for industrial attractiveness (steam price and availability)
- CAPEX = 26 M€
- => **direct and indirect value generation**



2. BIOLOGICAL RECOVERY OF INDUSTRIAL SMOKE FOR GREEN CHEMISTRY

ACTIONS PRINCIPALES DE VASCO2

Vasco2



RÉCOLTE DE MICROALGUES

CENTRIFUGATION

MICROALGUES CONCENTRÉES

CONVERSION

LIQUÉFACTION HYDROTHERMALE

ANALYSE DES PROPRIÉTÉS

BIOBRUT

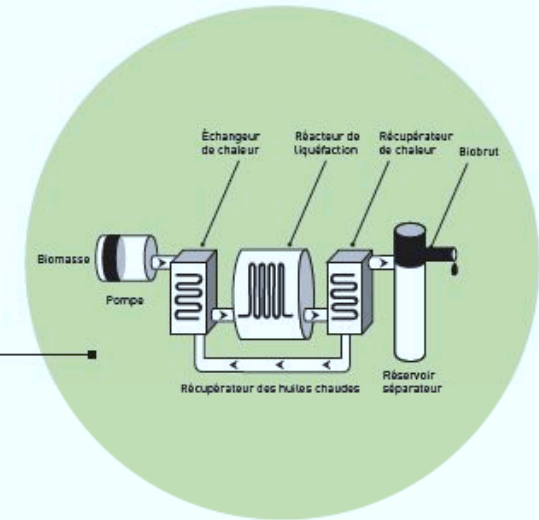
RAFFINAGE

EXTRACTION

DISTILLATION

COMPARATIF PÉTROLE

BIO HUILES



3. BIOLOGICAL RECOVERY OF INDUSTRIAL SMOKE FOR GREEN CHEMISTRY

Le coordinateur



Les start-up



Les industriels



Les centres de recherche



Le bureau d'ingénierie



L'institutionnel



Conseil de Territoire
Istres Ouest Provence



3. BIOLOGICAL RECOVERY OF INDUSTRIAL SMOKE FOR GREEN CHEMISTRY



The future can be seen in several forms:

- Using salt marshes abandoned or creating new surfaces dedicated to the cultivation of microalgae
- “Ponds farm” (2 000 m² to 10.000 m²)
- Photobioreactor culture (vertical or horizontal tubes)



NEW ECONOMIC ACTIVITY REDUCING GHG AND INDUSTRIAL EMISSIONS



THANK YOU FOR YOUR
ATTENTION