PORT OF MARSEILLE FOS

A SMART PORT FOR ENERGY TRANSITION AND ENVIRONMENTAL EXCELLENCE
Marseille Fos a multipurpose port

One port, two harbors

**Western Harbors-Fos:**
the Global Port/ 10 000 ha.

**Activities:** Containers, Petro-chemical complex, Energy, Solid bulk, Cars,

**Eastern Harbors-Marseille:**
the Shortsea Port/ 400 ha.

**Activities:** RoRo, ConRo, Cars, Breakbulk, Passengers – cruise & ferry

FOS 10.000 ha

INTERNATIONAL AIRPORT MARSEILLE PROVENCE

MARSEILLE 400 ha
Marseille Fos 2019 vs. 2018

- TEUs: 1.5 M
- Liquid Bulk: 46 MT
- Dry Bulk: 12.7 MT
- Passengers: 3.1 M Pax
- Cargo: +2%
- Cars: +23% (Q2)
- LNG: +5%
- Biofuels: +22%
- Chemical & food: +11%

- Containerized goods TEUs: +4%
- Liquid Bulk: +1%
- Dry Bulk: -15%
- Ferries & Cruise: +5%

45,000 direct and indirect jobs
3.5 billion euros of added value
Increasing massified inland modes: 2019 vs. 2018

Multimodal options for inland transportation, modal shares 2019 vs. 2018:

- River network: + 9.8%
- Rail network: + 34.4%
- Highway network: - 5.2%
Marseille Fos: a multimodal network

Fast expansion of regular rail services

25 destinations in France & Europe

Open competition between rail operators
Marseille Fos: a multimodal Network

Growth of river traffic

5 SERVICES PER WEEK: Fos - Valence - Lyon
Green Port and Blue Economy

→ Combining environmental excellence and competitiveness for a better attractiveness
A collaborative action initiated by

Supported by

With major companies
3 fields / 4 operational objectives

- Smart & efficient logistics
- Industrial & energy excellence to improve environmental efficiency
- Best-in-class digital offer

- A fluent port
- A green port
- A positive energy port
- An innovative and job-creating port
The CCS connects up all entire supply chain with smart door-to-door goods tracking.
Integrated Intelligent Multimodal Transport

A Tool for Optimal Coordination Of Cargo & Equipment
Marseille: Data hub for the digital submarine cables
Shore-to-ship power
Marseille 1st Port in Mediterranean to plug ships on a regular basis

In progress for shiprepair and cruise:
A 20M€ investment plan to 2025
Marine geothermal energy

2 power plants providing heating, hot water, air conditioning
Partnership agreement focused on projects

The Brain Port Community brings together the academic community of the Aix-Marseille metropolitan area to work on mid and long term issues faced by economic partners:

• Research and development issues
• Training issues
THE SMART PORT CHALLENGE FOR OPEN INNOVATION

- Green Mobile Energy for reefer
- Energy recovery from cruise ships’ wastewater
- Facilitation of eco-friendly navigation practices
- Demonstrator of the environmental aspects of “Interxion River Cooling”
- Interactive promotion of the sustainable initiatives in the port of Marseille Fos
- Control of ships and port infrastructures based on IoT
- Making Smart Containers secure
- Video images, AI and port fluidity

Go to ➔ www.lefrenchsmartportinmed.com
PROJECTS LABELLING

- Artificial Intelligence for ports
- Electric pilot boats
- Port Smart Grid
- Environmental performance index
- Port Cyber Security
- Cross disciplinary degree

6 Topics
12 Labeled projects
+50 Active partners
SMART PORT OBJECTIVES & UN SDG’S

A fluent port

A green port

A positive energy port

An innovative and job-creating port
The energy transition as a green growth driver

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 (circular economy, innovation),
- Find new sources of growth for the port authority and its territory
- Pressure to reduce our environmental footprint

Strategic view of the port:
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 for diversification and sustainability
→ Renewable energies and H2 opportunities … !

(Already involved in these new activities => 120 MW renewables, circular economy, CO2 recycling, etc …)
Cold ironing deployment – NEXT STEPS

- It is proposed a phasing in 3 stages. The main technical issues are 1) the frequency conversion from 50 to 60 Hz to match that of the ships and 2) the power levels called.

<table>
<thead>
<tr>
<th>Phases</th>
<th>Targets</th>
<th>Nb of targeted ships</th>
<th>Voltage</th>
<th>Frequency</th>
<th>Estimated maximum power per ship</th>
<th>Possible break on connection</th>
<th>Number of berths to equip</th>
<th>Nb of simultaneous connections</th>
<th>Total est. investment</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Corsica Linea / ships dedicated to the Corsican public service</td>
<td>1 to 4</td>
<td>High</td>
<td>50 Hz</td>
<td>2 MW</td>
<td>No</td>
<td>3 at Morocco Dock</td>
<td>1 to 2</td>
<td>2 M€</td>
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<tr>
<td>1</td>
<td>Ships in small ship repair or long-term parking</td>
<td>Tous</td>
<td>Low</td>
<td>60 Hz</td>
<td>1 MW</td>
<td>Yes</td>
<td>1 mobile converter</td>
<td>1</td>
<td>0,5 M€</td>
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<tr>
<td>2</td>
<td>Ferries of international lines</td>
<td>5</td>
<td>High</td>
<td>50 Hz</td>
<td>3 MW</td>
<td>No</td>
<td>2 to 3 at Cap Janet</td>
<td>1 to 2</td>
<td>3 M€</td>
</tr>
<tr>
<td>2</td>
<td>Ships in industrial ship repair</td>
<td>All</td>
<td>High</td>
<td>50/60 Hz</td>
<td>6 MW</td>
<td>Yes</td>
<td>F8, F9, F10, P190</td>
<td>1 to 2</td>
<td>12 M€</td>
</tr>
<tr>
<td>3</td>
<td>Cruise ships</td>
<td>12 to 15</td>
<td>High</td>
<td>60 Hz</td>
<td>12 MW</td>
<td>No</td>
<td>2 to 3 at MLG</td>
<td>1 to 2</td>
<td>18 M€</td>
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</tbody>
</table>
Localisation of cold ironing projects in the port of Marseille…
Cold ironing projects in Fos about to be implemented.
Marseille-Fos – major LNG bunkering hub

- LNG: Very significant reduction of the three main pollutants SOx, NOx and particles, though results are less effective on the reduction of greenhouse gas.

- LNG is however a good alternative because it can be used both in navigation, when approaching the port, when maneuvering and at the dock.

- The port of Marseilles Fos, with its industrial partners (suppliers of molecules, industrial tankers, shipowners) puts itself in a position to play a major international role in the LNG bunker supply.
Port of Marseille-Fos Hydrogen VISION => [H2 Hub] in 4D

- **D1 – PRODUCTION [H2 Hub]**
  - Industrial H2 co production: > 10KT/year
  - Potential H2 production by electrolyse: Industrial water + available land areas for H2 factories, renewable electricity production (>100 MW)

- **D2 – CONSUMPTION [H2 Hub]**
  - 360° mobility:
    - Trucks = 2 Millions movements / year
    - Trains = 7,000 movements / year
    - River shuttles = 3,000 movements / year
    - Logistics = 3 Millions m² warehouses
    - Maritime = ships and stevedoring
  - Industrial applications: power to methanol, bio refinery, ...
  - Energy storage: Power to gas
  - Stationary applications: ships electrical connections, network services (storage, power smoothing)

- **D3 – IMPORT / EXPORT [H2 Hub]**
  - Maritime Terminal: H2 traffic import and export
  - High storage capacity and distribution network potential in the hinterland

- **D4 – INNOVATION [H2 Hub]**
  - INNOVEX: incubator of innovation for pre industrial demonstrators (12 ha) => Jupiter 1000, Fuel cells for ship connection and electrical storage, ...
  - D4 – INNOVATION [H2 Hub]
VALHYDATE 2016 : a first collective initiative to structure the H2 opportunities in a global territorial project
2020 - Several H2 projects are on progress on the port

- **JUPITER 1000 on INNOVEX**: power to gas demonstrator, 1MW electrolyse and 0.5MW methanation
- => First H2 production in July 2019
2020 - Several H2 projects are on progress on the port

- Integrated service demonstrator using containerized H2 fuel cells for mobile applications in the port of Marseille:
  - Ship electrical connection for ferries and roro ships: 2 MW, 6600 and 11000 Volts, 50-60Hz
  - Power smoothing for naval reparation issues: 6 MW needed for pumping forms of naval repair
  - Electrical smart grid application: PV production and H2 storage facilities needed
2020 - Several H2 projects are on progress on the port

- OTHER H2 PROJECTS UNDER CONSTRUCTION IN FOS / Target 2022:
  - Hydrogen refueling station for trucks, bus and vehicles
  - Daily H2 freight train (>50 containers)
THANK YOU FOR YOUR ATTENTION