

# La décarbonation des ports: un enjeu crucial pour le secteur maritime

**Franck Verbecke**

Directeur Business Développement HELION hydrogen Power



# Introduction

- Ports and maritime sectors are key targets for emissions reductions (GHG, NOx, SOx, and particulate matter emissions)
- Challenge of growing activities/expansion while reducing emissions
- In the shipping sector, the International Maritime Organization set the objectives of reducing emissions by 30% in 2030 and 50% in 2050 compared to 2008 level
- Replacing combustion technology by clean solutions to tackle GHG emissions and air quality for communities in close proximity to ports e.g. Marseille
- Hydrogen and Fuel Cell technologies are ready to take a major part in Ports and Maritime sector where many heavy duty applications are running



JOURNÉES  
HYDROGÈNE  
DANS LES  
TERRITOIRES  
7ÈME ÉDITION  
MARSEILLE 2019

VIDEO

# On-board power

- Zero emission propulsion (2021)
  - Passenger ferry in Brittany region
  - On-going discussion
  - 2 x 1 MW Fuel Cell
  - Hybrid solution: battery + H2
- On-board FC for pollution reduction in ports (2023)
  - Passenger ferry
  - Preliminary discussions
  - 1 MW FC
  - Hybrid solution Diesel + H2



# Zero Emission Freight from ports

- Inland shipping

- Transport of goods in Toulouse
- 80 to 150 kW
- Hybrid solution: battery + H2



- Rail

- Feasibility study
- On-going discussions for a pilot in Marseille area
- 1 MW train
- Hybrid solution: battery + H2



# On-shore clean power supply (up to 2 MW)

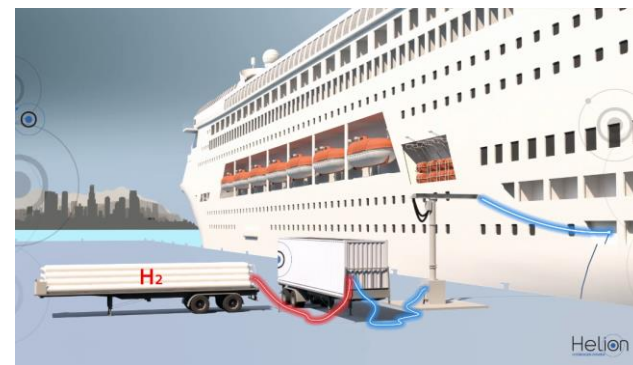
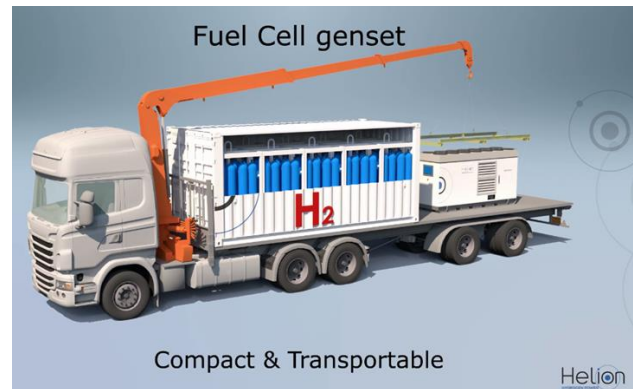
## 150 kW FC

	HC 20' container	HC 40' container
Pressure, bar	300	300
H2 stored, kg	411	823
Autonomy at 150 kW net max power, h	48	67

## 2 MW FC

	HC 40' container	Trailer
Pressure, bar	300	300
H2 stored, kg	823	1000
Autonomy at 1 590 kW net nominal power, h	7,9	8,9

On-going discussion with Marseille, Toulon and Sète ports for a 2 MW FC solution



# Yard tractor and container handling

- Yard tractor and container handling are responsible for a significant demand of diesel on Ports
- In The Port of Valencia (5th largest port in Europe) 90% of demand for diesel is caused by rubber-tired gantry cranes and yard tractors
- On-going demonstrations in ports for LNG and battery terminal tractor prototypes
  - LNG not a zero emission technology
  - Battery with long charging time
- FC tractor can be an alternative for zero emission and fast-filling time



  
**GAUSSIN**  
MANUGISTIQUE®

  
HYDROGEN POWER

# Refrigerated containers & FC powered forklift

- Refrigerated containers
  - Frigorific compressor plugged on grid network or on diesel generators
  - When plugged on grid network, generates important electricity consumption e.g. 80 % in Valencia Port
  - When working on diesel mode, generates pollution and noise
  - On-going study to replace diesel generators by FC
- FC Forklifts in warehouse
  - More than 20,000 FC forklifts running requiring 16,000 fills per day at 70 fueling stations across US
  - FC vs batteries forklifts:
    - Increased Productivity vs batteries
    - Smaller Equipment Footprint vs battery room
    - Constant Power Supply vs battery drop in performance
    - Lower Environmental Impacts







# Conclusion

- Port and maritime sectors are key targets for emissions reductions
- Hydrogen and Fuel Cell technologies are ready to take a major role to decarbonize these sectors where many heavy duty applications are running
- Use of low-carbon or green hydrogen is another key for positive environmental impact
- Massive hydrogen production and FC deployments have to be planned at territory level to trigger commercial success



# Thank you for your attention

monaco-matin

RETOUR | Environnement > A Monaco, le secteur maritime teste l'hydrogène en compétition



## A Monaco, le secteur maritime teste l'hydrogène en compétition

#MONACO #ENVIRONNEMENT PAR THIBAUT PARAT Mis à jour le 04/07/2019 à 09:54 Publié le 04/07/2019 à 09:00



Helion  
HYDROGEN POWER  
By AREVA