



Aberdeen  
UK



Akershus  
NO



Aragon  
ES



Arnhem/Nijmegen  
NL



Hamburg  
DE



NRW  
DE



Occitanie  
FR



Rogaland  
NO



Berlin  
DE



Bolzano  
IT



Drenthe  
NL



Groningen  
NL



Riga  
LT



Skane  
SE



Torres Vedras  
PT



Transp. Scot  
UK

# Maritime Energy Transition – Setting the Course towards Decarbonisation of Shipping

**Searica Intergroup**

European Parliament – 27.06.2018

**Valentine Willmann**

EU Policy, Projects & Partnerships Manager

**Hydrogen, Fuel Cells and Electro-mobility in European Regions**

# Impact of shipping and port operations on air quality

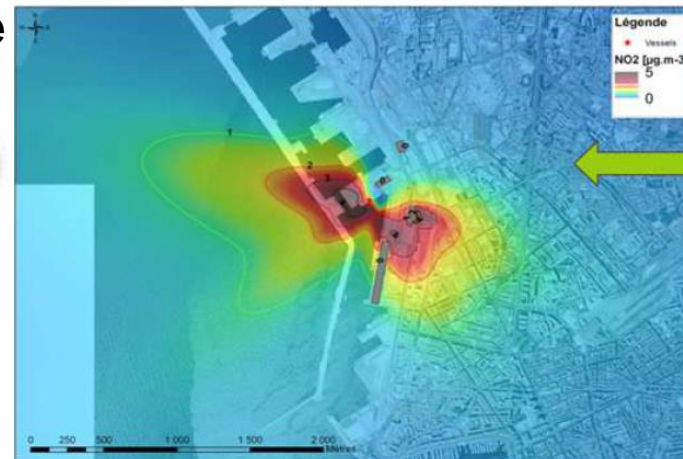
## Cities and regions are heavily impacted by emissions from the maritime sector

- Ports often located close to city centres
- Emissions predicted to increase a lot in next few decades
- Concentration of emissions and concentration of population around port areas, impact on quality of life: noise and vibration levels
- Ports are key for trade: need to remain competitive in the future

### → A lot of interest to decarbonise the maritime sector

↳ Emissions from shipping

↳ Emissions from port operations



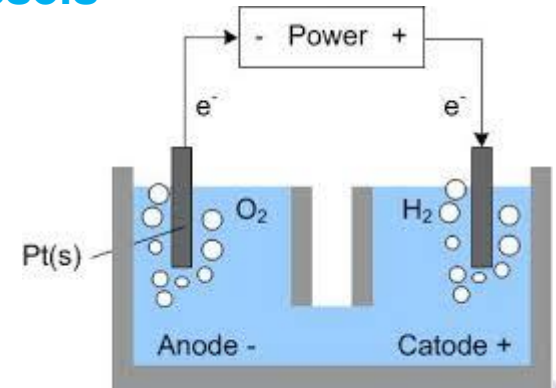
**Example: port of Marseille, France**  
Source: Air PACA / Region PACA

# Zero emission solutions



## Fuel cells are a solution for large, heavy vessels

- Hydrogen can be produced from renewable electricity → zero emission fuel
- Applications: ferries, tankers, container ships, cruise ships etc.
- Interesting for regions with surplus or curtailed renewable energy



*Electrolysis:  
production of green  
hydrogen*

Renewable electricity



Hydrogen production



Hydrogen applications

Maritime applications



### Advantages:

- Long range, short refuelling time
- Modular and flexible system
- Can be hybridised with other technologies

# Hydrogen & fuel cells



## Current developments

- Demonstration stage: more research will solve the technological challenges
- Demonstration projects have proven that the technology is working and well adapted for the maritime sector
- Outlook to future:

↳ **10 years: hydrogen for auxiliary power units, a few users with local hydrogen production**

↳ **Long term: engines powered by hydrogen or hybrids, large number of users**



### **MARANDA project - [project info](#)**

- Focusing on the development of the fuel cell system
- Demonstration vessel: retrofit of a finish research vessel operating in artic conditions
- Vessel will be tested for 18 months



### **HySEAS project in Scotland**

- Ship was first hybridised (diesel/ electricity) – 20% emission savings
- Are now looking to replace diesel with hydrogen – 100% savings

# Challenges



## What needs to be done today?

- Storage of large quantities of hydrogen in ports + bunkering
- Storage of hydrogen on board of vessels – compressed? Liquified?
- Chicken and egg situation: right infrastructure needs to be in place in ports (storage, distribution, bunkering)
- Technology is still expensive, not a lot of potential for replicability in maritime sector

**The absence of specific regulations and standards is hindering the development of the technology:**

- Currently a very clear and highly damaging regulatory gap, especially for the design and type approval of hydrogen vessels, as well as for landing/bunkering
- Presently, the use of hydrogen as a fuel and hydrogen fuel cells is not explicitly covered by IMO rules

**→ Is vital to prepare a regulatory framework favourable to the testing and introduction of innovative technologies**



# Decarbonisation of port operations



## Establish ports as zero emission areas

### On shore power generation

- Provide power supply for ships stationed in harbour
- Could be interesting for cruise ships in the future for instance

### *Surf & Turf project – Orkney (Scotland)*

- Onshore excess renewable energy used to produce hydrogen
- Hydrogen is shipped to the port
- Used to supply electricity to the ships while docked

[www.surfnturf.org.uk](http://www.surfnturf.org.uk)



### Material handling equipment

Cranes, forklifts, heavy duty trucks, waste management vehicles

- So far mainly with non-port-specific equipment
- Commercially available product



# Thank you for your attention

## Contact

[valentine@hyer.eu](mailto:valentine@hyer.eu) / + 32 48799 82 98

HyER Secretariat - Avenue Palmerston 3, 1000 Bruxelles  
[secretariat@hyer.eu](mailto:secretariat@hyer.eu)

[www.hyer.eu](http://www.hyer.eu)