HyER / opportunities for hydrogen in the maritime sector

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About HyER

Representing the interests of European regions and cities active in the field of hydrogen, fuel cells and electro-mobility

- Membership based network / political organisation
- 16 members in 10 countries
- **Aim**: help our members to develop their hydrogen and electro-mobility activities

Enabling the share of knowledge

Bridging the gap

**Electro-mobility**

- Battery electric vehicles
- Fuel cell electric vehicles
What is hydrogen?

A zero emission fuel

- Hydrogen is a gas which is used as a fuel: the fuel cell converts hydrogen into electricity in the vehicle
- Hydrogen can be produced from renewable electricity → zero emissions during energy production + during use

Potential for complete decarbonisation of the transport system
Can help to integrate more renewables in the energy system
Why hydrogen?

- High range, fast refuelling, passenger comfort, operation similar to conventional fuel vehicles

- Hydrogen can become a strategic interest for a region → economic development opportunity

- Technology is still expensive, infrastructure needs to be deployed

→ Growing regulatory push for decarbonisation of transport

→ Cities and regions are the ones who will have to implement solutions!
European cooperation

How can it help?

• Transnational interoperability, transnational customer information are essential for the development of zero-emission transport and energy systems → European cooperation is essential in these sectors

• Successful demonstration projects in Europe → learnings can be shared, many local authorities are facing the same challenges

• Local authorities have a purchasing power → joint procurement

• Funding available at EU level
Hydrogen & maritime sector

What opportunities? What challenges?

- Batteries alone will not be enough to decarbonise vessels (weight and space constraints)
- But hybridisation of engines could be a good solution

- Maritime sector applications are a bit less advanced than other applications - advanced prototype stage
- Currently only demonstration boats in operations but more projects in planning stage

Challenges:

- Cost: cost reductions linked to volumes are difficult to achieve
- Harbours need to be ready for the energies of the future: fuel needs to be available in ports across Europe/ the world
- Infrastructure: you need a refuelling infrastructure + large quantities of hydrogen
- Regulations and standardisation need to be tackled
Project examples – ships

MARANDA project - project info
- Focusing on the development of the fuel cell system + prove that the technology is working
- Demonstration vessel: retrofit of a finish research vessel operating in artic conditions Vessel will be tested for 18 months – not in operation yet
  - 165 kW (2x 82.5 kW AC) fuel cell powertrain (hybridised with a battery)
  - Mobile hydrogen storage container developed for the refuelling - 350 bar refuelling

HySEAS project in Scotland
- Caledonian MacBrayne, ferry operator in Scotland
- Ship was first hybridised (diesel/ electricity) – 20% savings
- Are now looking to replace diesel with hydrogen – 100% savings

- Built by Belgian shipping group CMB – in operation
- Used to transport their own employees to avoid traffic jams in the city
- Are considering hydrogen for their entire fleet (96 vessels)
Port ecosystems

Establish harbours as zero emission areas

On shore power generation

- Provide power supply for ships stationed in harbour
- Possibility to produce hydrogen on site from solar or wind
- Interesting especially for inner city harbours

*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
→ Relatively easy to create a critical mass of vehicles to make use of hydrogen cost-effective

[Image of material handling equipment]
Thank you for your attention

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