Status of Hydrogen development in Europe and perspectives for the use of hydrogen in inland navigation

Expert Meeting on Development of Ports and Port Operations

21.03.2023

Hydrogen Europe

HYDROGEN EUROPE in numbers

450+ Members

We encompass the entire value chain of the hydrogen ecosystem: from production, distribution to end uses, including Industry, EU regions & H2 National Associations. Meet Our Members

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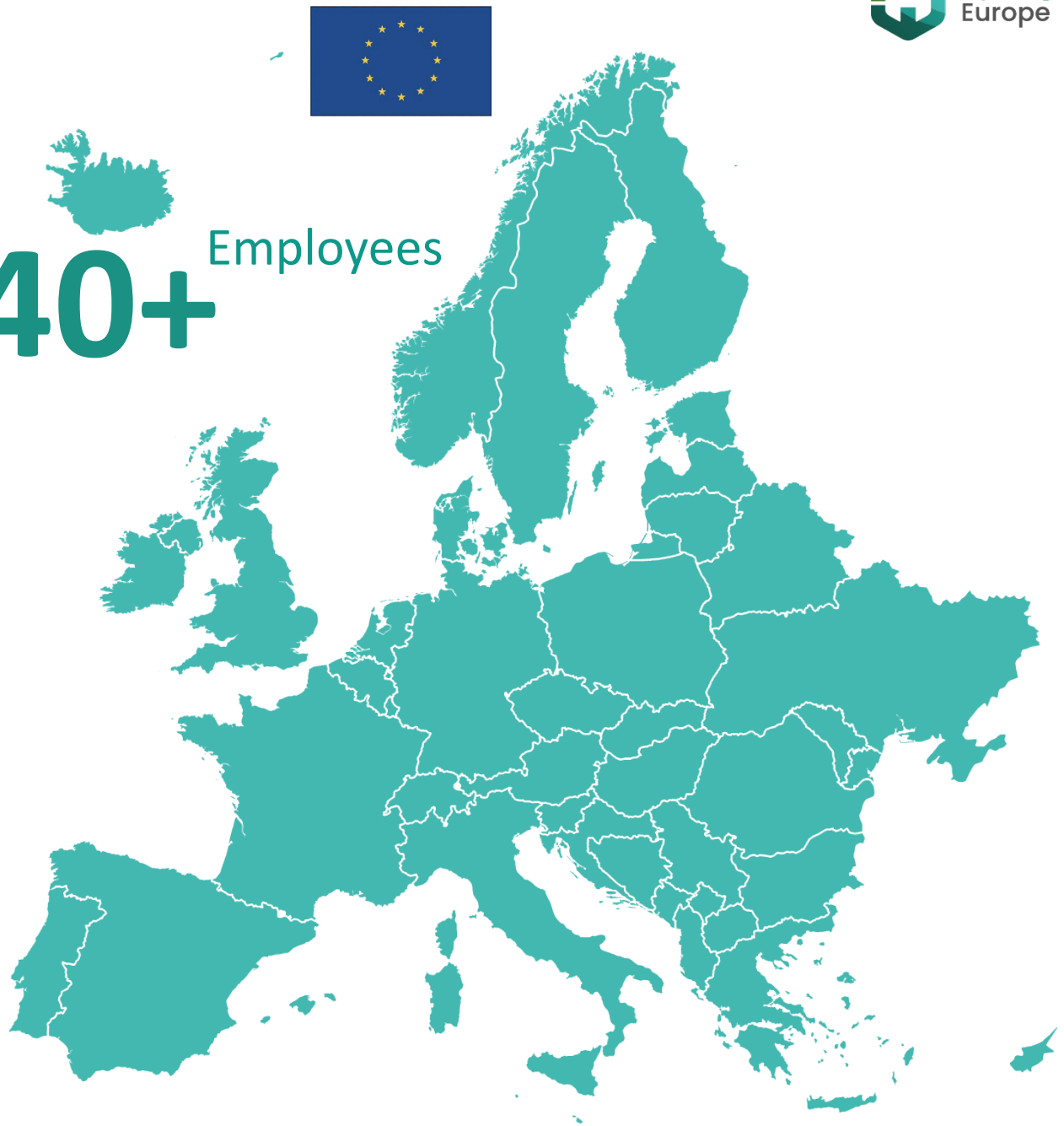


Why hydrogen for water transport ?

Reducing GHG emission in the transport sector is crucial for climate change and air quality. The EU Green Deal sets the objective to reduce by 90% the CO2 emissions of transport by 2050.

Almost 100% of inland vessels are fuelled by gasoil, emitting CO2 but also nitrogen oxides (Nox), particulate matter (PM) and sulphur dioxide (SO2). Given its big role in European freight, there is a great potential for inland waterways industry to become environmentally friendly.

The advantages of hydrogen propulsion technologies for water transport:

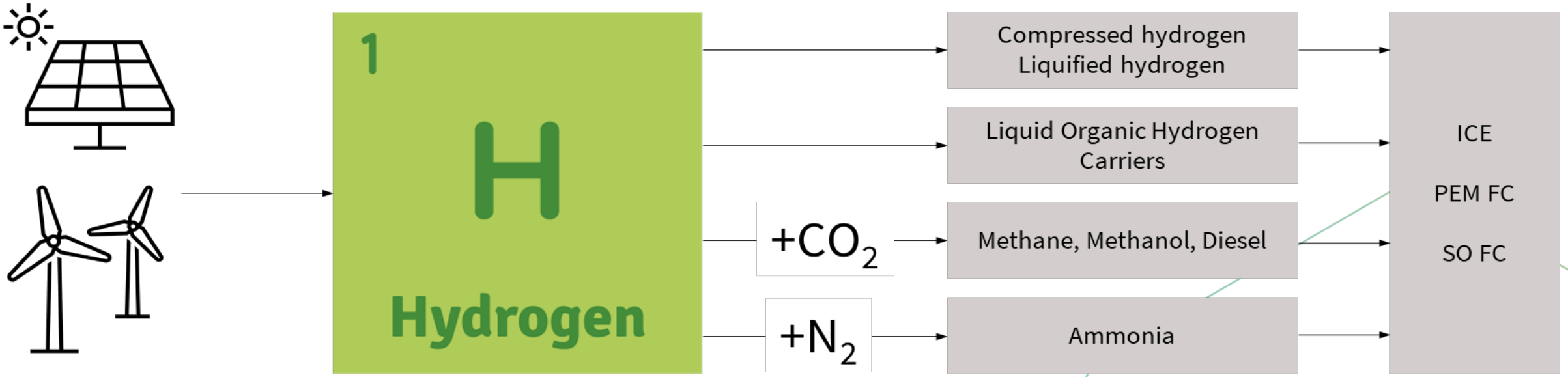
- Can be used in fuel cells, dual fuel mixture with conventional fuels, or replacement in the combustion process
- If produced from renewable energy, hydrogen enables **reduction of up to 100% of Well-to-wake GHG emissions**
- Less air pollution in cities with inland ports ;
- Offers potential synergy opportunities between the shipping sector, industrial base in ports and the energy system
- **Ports are set to become key hubs of the hydrogen economy**

Potential issues and challenges of the use of hydrogen in water transport:

- Relatively low volumetric energy density
- High production costs of renewable hydrogen
- Safety concerns and high inflammability

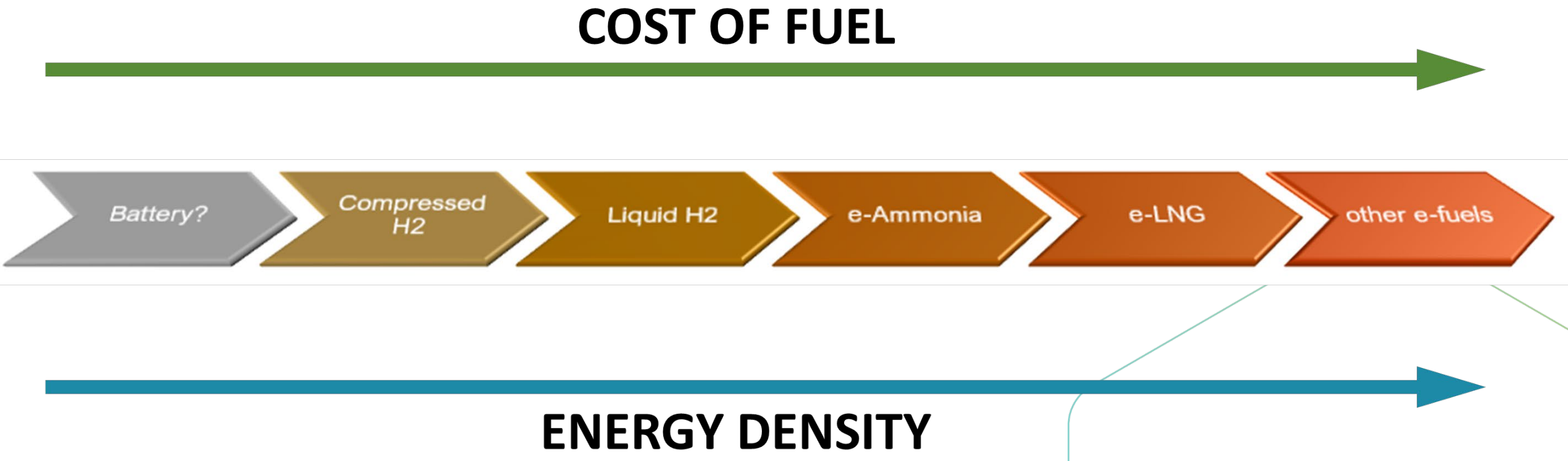
Hydrogen-based options for shipping

Lack of a clear preferable option is holding back investments



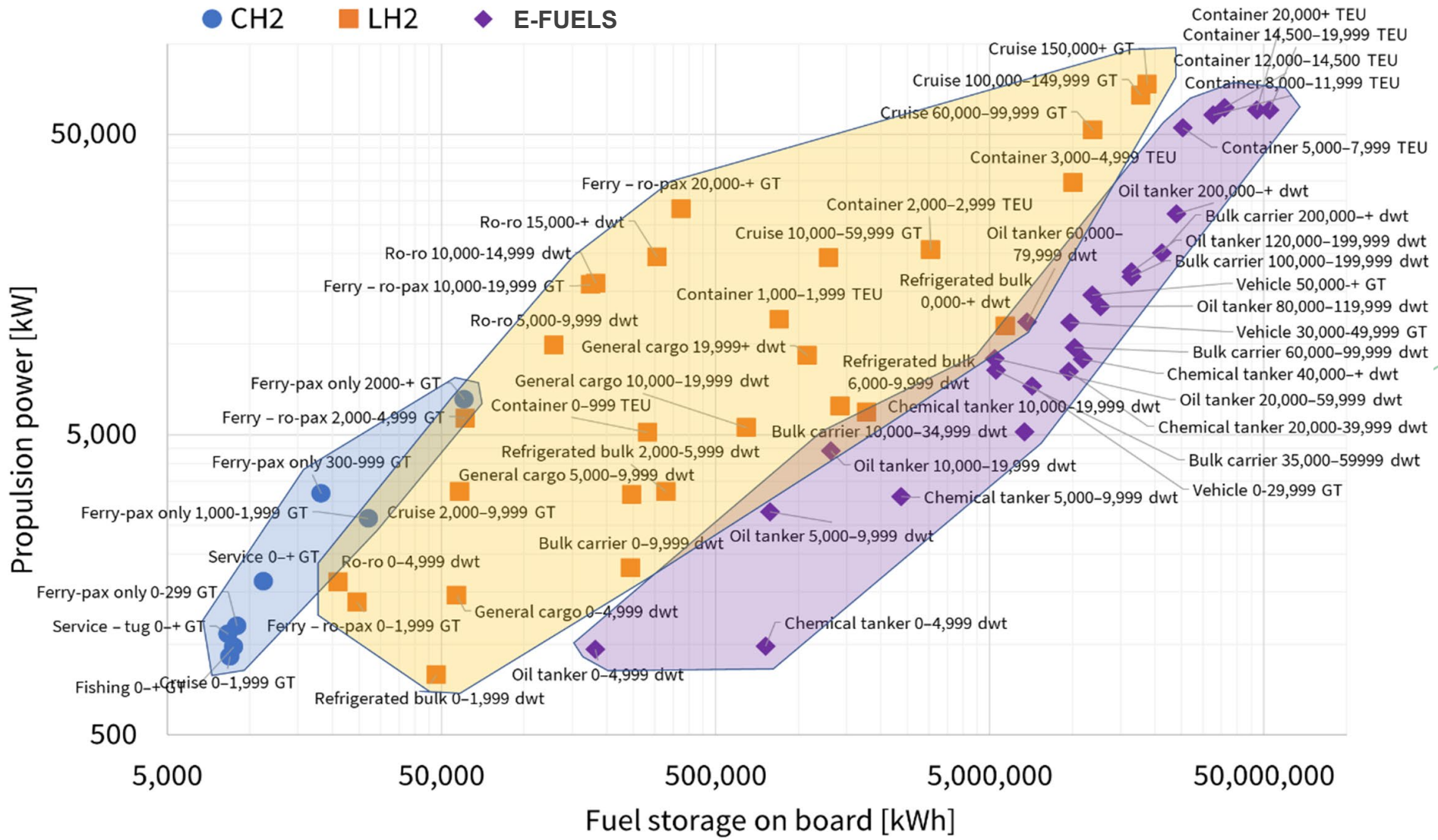
Key rule-of-thumb

The most energy-dense fuels are also the most expensive ones



Lowest TCO zero-emission option

There is not going to be a one fit-for-all solution



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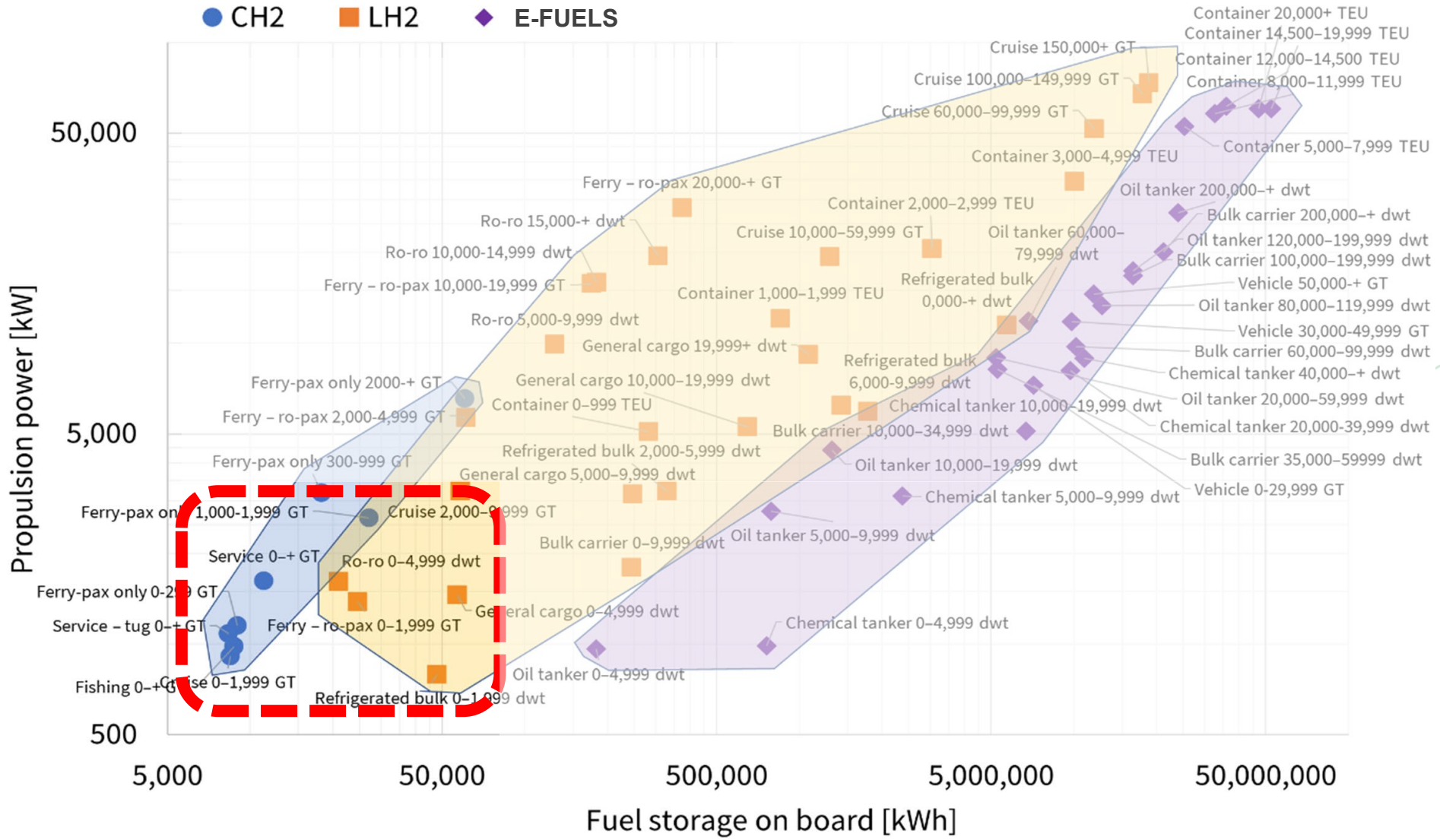
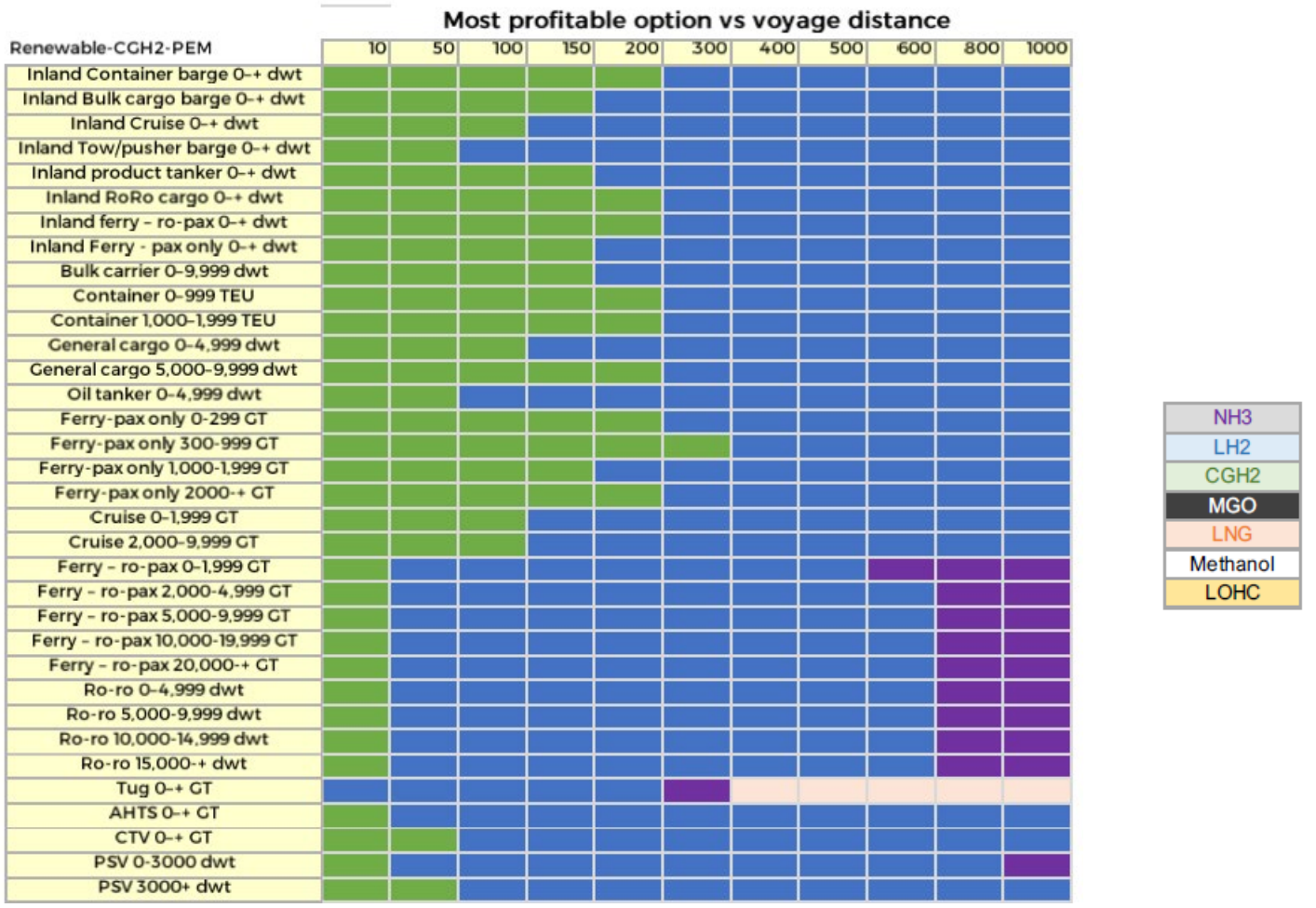


Lowest TCO zero-emission option

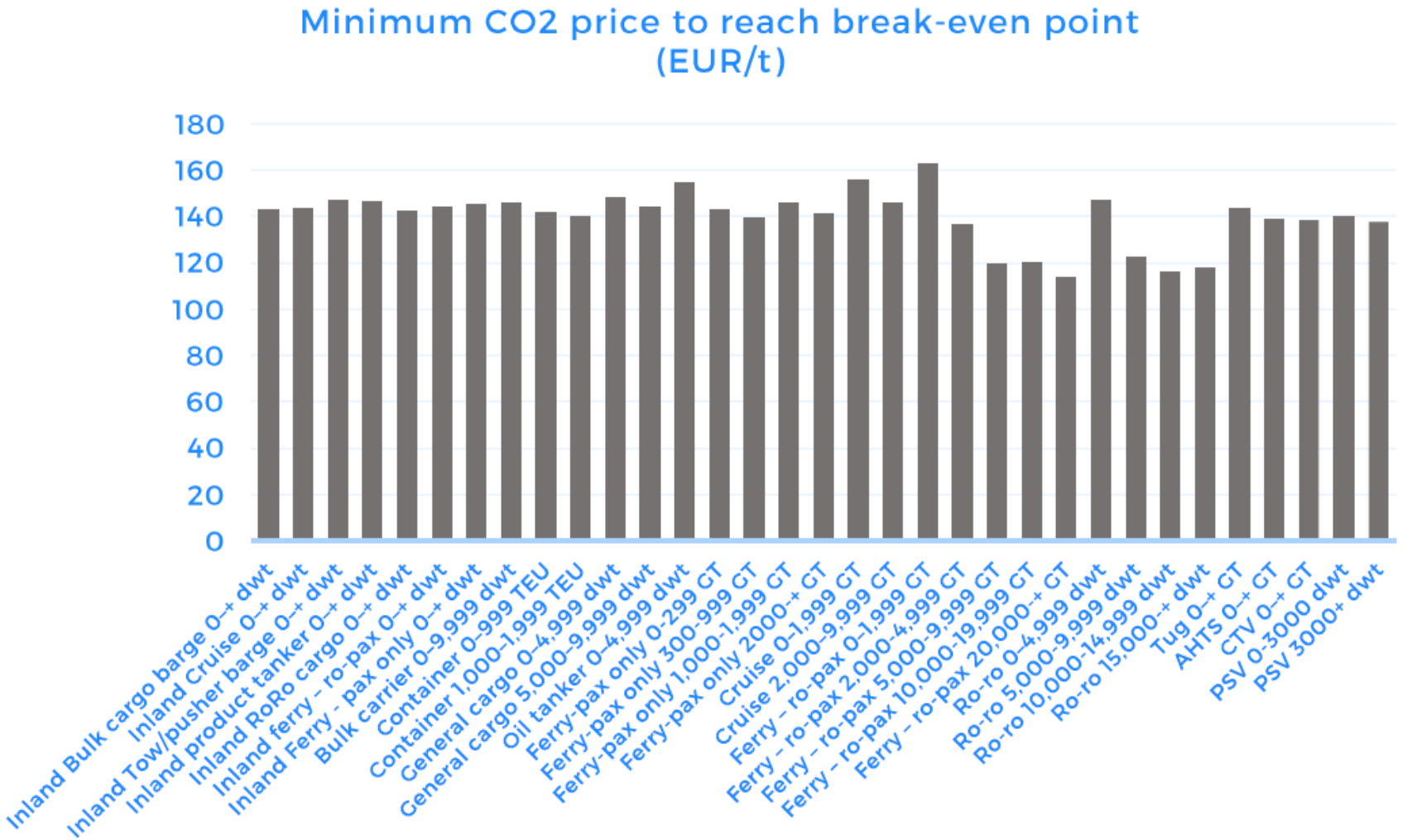
The is not going to be a one fit-for-all solution

- The suitability of hydrogen as a fuel is heavily depending on the business model and the required fuel autonomy
- For operating profiles which allow for short distance / frequent refuelling – compressed hydrogen is the most cost – efficient option
- For inland shipping we see limited economic viability for e-fuels – especially if CO2 sources are limited to DAC



CO2 tax break even-point

For most business cases there is still a sizeable financial gap for hydrogen based options



Fit for 55 Package is an opportunity to regulate and promote the use of hydrogen and hydrogen-derived fuels in the whole value chain

Hydrogen Europe

Instruments affecting fuel suppliers

- Renewable Energy Directive

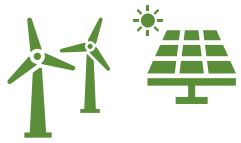
Instruments affecting fuel users and ships operators

- Fuel EU Maritime Regulation
- EU ETS
- Energy taxation directive

Targets for refuelling infrastructure providers

- Alternative Fuels Infrastructures Regulation

Supply



Demand

Infrastructure

RED II REVISION

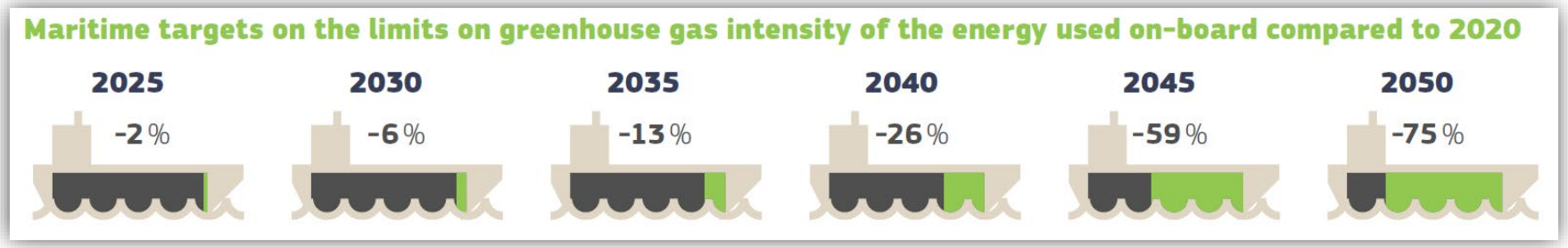
TARGETS

EC's Proposal	40% RES by 2030 45% (RePowerEU)	**Transport** 13% GHG reduction by 2030	**Transport** 2.6% RFNBOs by 2030 5% (RePowerEU)
Council's Proposal	40% RES by 2030	**Transport** 13% GHG reduction by 2030	**Transport** 5.2% by 2030 **(NOT Binding)**
EP Proposal	45% RES by 2030	**Transport** 16% GHG savings target in transport by 2030	**Transport** 2.6% RFNBOs by 2028 and 5.7% by 2030 of **which 1.2% for maritime**

Hydrogen Europe advocates to **maintain the binding target for RFNBOs in transport and the sub-target for maritime transport,** to ensure availability of feedstock for hydrogen applications in the sector.

FuelEU Maritime
Commission Proposal (14th July 2021)

- Regulation aims to reduce the GHG intensity of energy used on-board by ships by:



- It doesn't prescribe one technology to be used, only a pathway to GHG intensity reduction on board
- Scope :
  - Intra-EU traffic and 50 % of extra-EU traffic
  - Focus on ships > 5,000 GT
- Links fuel ‚eligibility' to RED II
- Obligation for passenger and container ships to connect to OPS or use zero-emission technologies at berth

Work through the Water Transport Sub Group

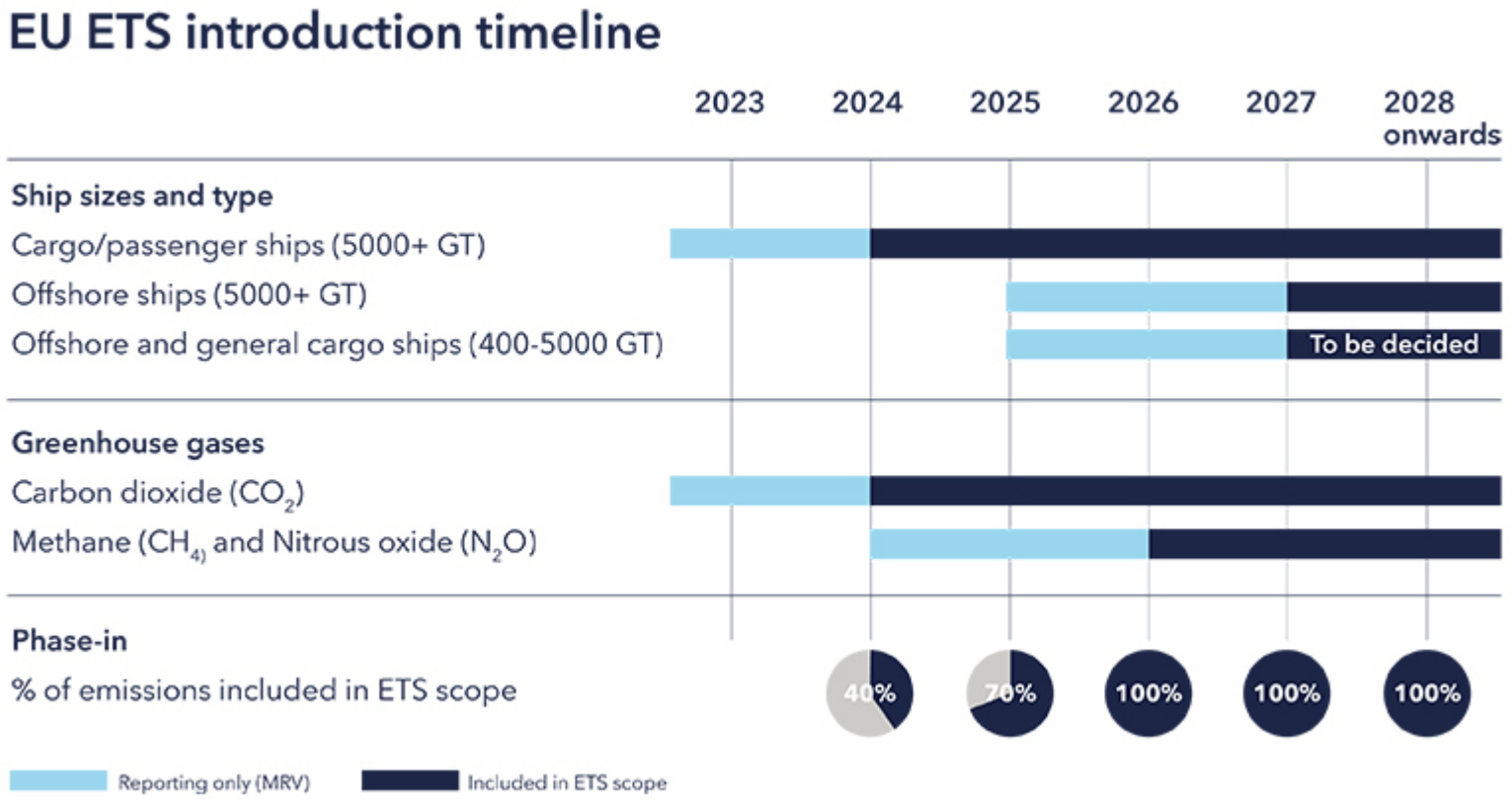
Hydrogen Europe advocates for a **sub-target on the use of RFNBOs in replacing specific GHG emission** to guarantee consistency with REDII targets, and ensure the development of the value chain for RFNBOs use in maritime.

This was backed by the Parliament which introduced a 2% subquota for RFNBOs for ships operators for 2030.

Extension of the EU ETS

For most business cases there is still a sizeable financial gap for hydrogen based options

- Extension of the EU ETS to cover the maritime sector could have the potential to (at least partially) bridge the funding gap, but....
- It has been linked to the MRV – i.e. will cover only ships > 5,000 GT which excludes most of the inland shipping sector



Source: DNV

AFIR – Alternative Fuels Infrastructure Regulation

Article 10 on inland waterway ports :

Member States shall ensure that:

(a) at least one installation providing shore-side electricity supply to inland waterway vessels is deployed at all TEN-T **core inland waterway ports by 1 January 2025**;

(b) at least one installation providing shore-side electricity supply to inland waterway vessels is deployed at all TEN-T **comprehensive inland waterway ports by 1 January 2030**.

Article 9 and 11 ensure the supply of LNG and electricity to maritime ports, to be consistent with FuelEU Maritime provisions

The European Parliament introduced amendments to ensure the supply of ammonia and hydrogen to maritime ports in article 11 – negotiations are still ongoing.

Work through the Mobility Working Group

Hydrogen Europe advocates for a **bigger place of hydrogen and ammonia within ports and inland ports for refuelling infrastructures.**

H2Ships Project Presentation

System-Based Solutions for H2 Fuelled Water Transport in North West Europe

H2SHIPS is an **Interreg Project** (across different Regions in the EU) to demonstrate the feasibility of **hydrogen bunkering and propulsion for shipping**, both on sea and inland waterways.

Two pilot projects :

- New hydrogen powered port vessel to be built in Amsterdam and in Belgium with a newly built hydrogen refuelling station
- Implementation of an **H2SHIPS pilot on the Seine river in Paris** after the end of the project

By the end of the project, H2Ships expects to have created the necessary conditions for uptake of its technologies by 2% of the fleet renewal.

The Project has a total budget of 6,33M€ and received 3,47M€ from the Interreg Programme > Hydrogen Europe is a partner of this project, amongst 12 others

More information here : [H2SHIPS - System-Based Solutions for H2-Fuelled Water Transport in North-West Europe | Interreg NWE (nweurope.eu)]

Thank You

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