



The International Maritime Transport and Logistics Conference

“MARLOG 12”

**Sustainable & Innovative
Technologies**
Towards a Resilient Future
12 - 14 March, 2023 Alexandria - EGYPT





Alternatives Fuels for the Maritime Sector. Green Hydrogen.

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**Head of Europeans Affairs
Algeciras Bay Port Authority**



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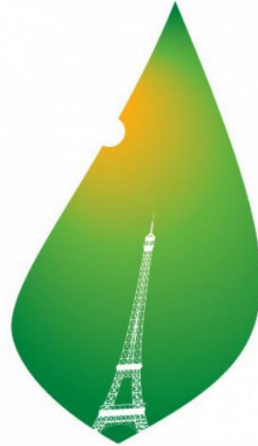
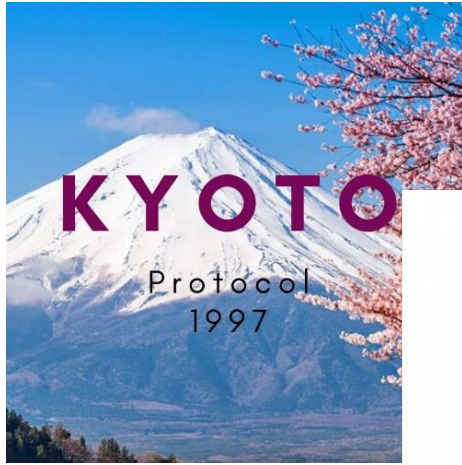
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PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP1

International Context

UNITED NATIONS
CLIMATE CHANGE

COP 27

SHARM EL-SHEIKH
7-18 NOVEMBER 2022





x 537

Europe must reduce emissions from transport further and faster.

01

ETD MARITIME

With the new Energy Tax Directive, tax exemptions for marine fuels are partially ended.

Fuels sold in the European Economic Area, for trips within the EEA, will no longer be exempt from taxes

02

AFIR

Boosting the expansion of LNG and shore power supply facilities in the main ports of the EU.

The former Alternative Fuel Infrastructure Directive becomes a Regulation

03

EU ETS

Maritime transport is incorporated into the EU Emission Trade System.

Ships are responsible for 100% of their CO2 emissions in and between EU ports, and 50% when entering or leaving the EU.

They should pay according to the carbon market price of each moment (€/CO2 Ton)

04

FUEL EU

It will promote the adoption of low-emission fuels by imposing limits on the carbon intensity of fuels on board ships.

Same scope of action as ETS, although the levels of carbon intensity of fuels reduction will increase progressively in a different way (2% 2025, -6% 2030, 75% in 2050).

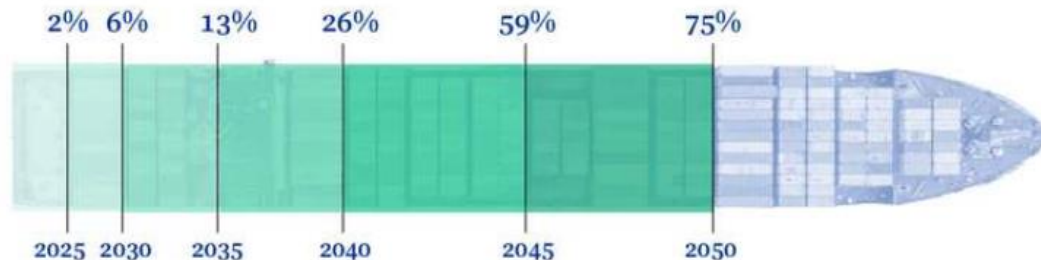
- Tráfico/Servicio
- Contenedores
- Reefer
- Carga rodada
- Practicaje
- Remolque
- MARPOL



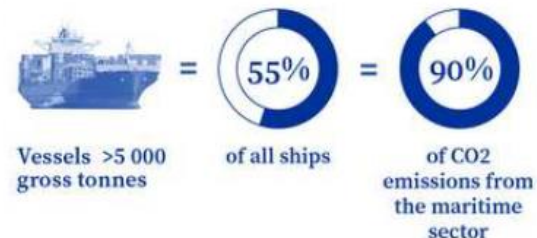
The FuelEU maritime regulation will oblige vessels above 5 000 gross tonnes calling at European ports (with exceptions such as fishing ships):

→ to reduce the greenhouse gas intensity of the energy used on board as follows

Annual average carbon intensity reduction compared to the average in 2020



→ from 2030, to connect to onshore power supply for their electrical power needs while moored at the quayside, unless they use another zero-emission technology



A.P. Moller - Maersk continues green transformation with six additional large container vessels

05 October 2022

Ocean Transport Sustainability
North America West Central Asia



Copenhagen, Denmark – A.P. Moller vessels that can sail on green methanol have a capacity of approx. 17,000 containers.

“ Our customers are looking to operate on green methanol to meet the climate neutral transition Agreement’s goal of limiting global warming to 1.5°C.

Henriette Hallberg Thygesen
CEO of Fleet & Strategic Brands

World Premiere: Launching of the World's Largest LNG-Powered Containership and Future CMA CGM Group Flagship

Wednesday, September 25, 2019

Share

- The CMA CGM JACQUES SAADE, the first in a new fleet of nine French-flagged, 23,000-TEU, LNG-powered containerships
- An outstanding tribute to the CMA CGM Group
- Packed with an extensive array of environmental technologies
- CMA CGM, the world’s first maritime shipping company to launch a fleet of large containerships



Shipping Lines clean fuel efforts



About MSC > News > Clean Marine Fuels: Total to Supply MSC Cruises' Upcoming LNG-Powered Cruise Ships

NEWS

CLEAN MARINE FUELS: TOTAL TO SUPPLY MSC CRUISES' UPCOMING LNG-POWERED CRUISE SHIPS

25/03/2021

- **LNG fuel will sharply reduce emissions from ships and improve air quality at all ports of call**
- **New MSC Cruises' LNG vessels to be the most technologically and environmentally advanced in the world**

Geneva, March 25, 2021 - MSC Cruises and Total announced today a supply agreement for approximately 45,000 tons per year of Liquefied Natural Gas (LNG) to MSC Cruises' upcoming LNG-powered cruise ships.

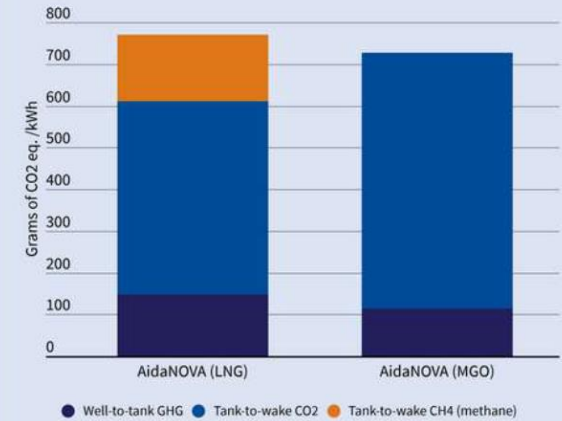


This month news

Types of alternative fuels. LNG

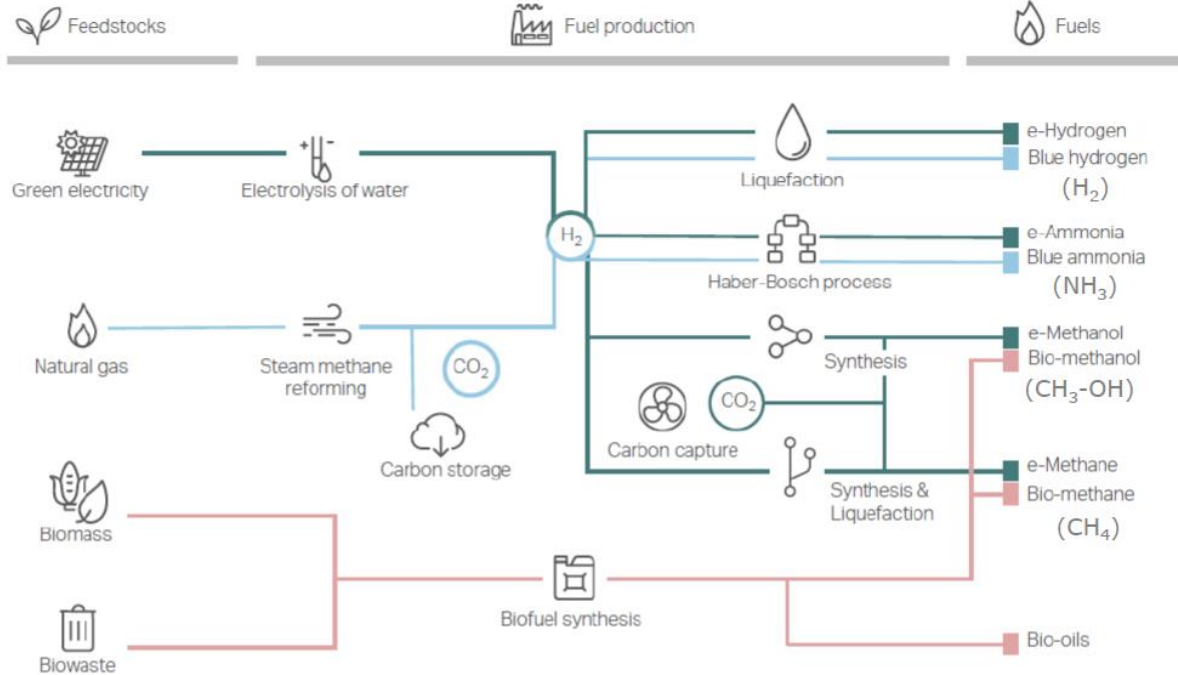
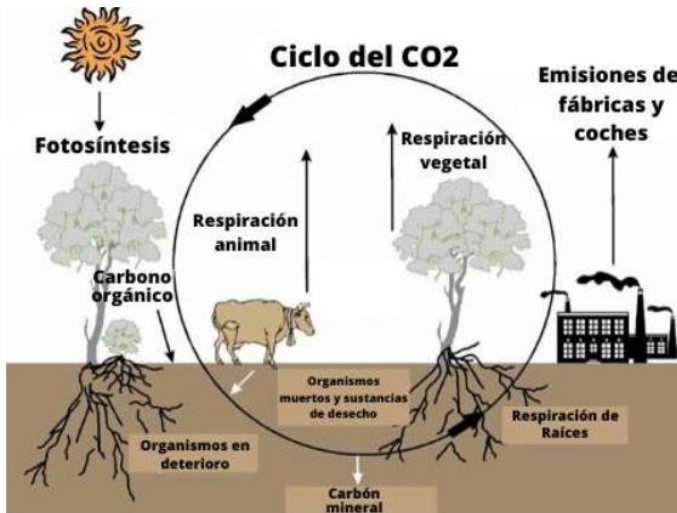


Greenwashing: GHG from LNG-fuelled AidaNOVA

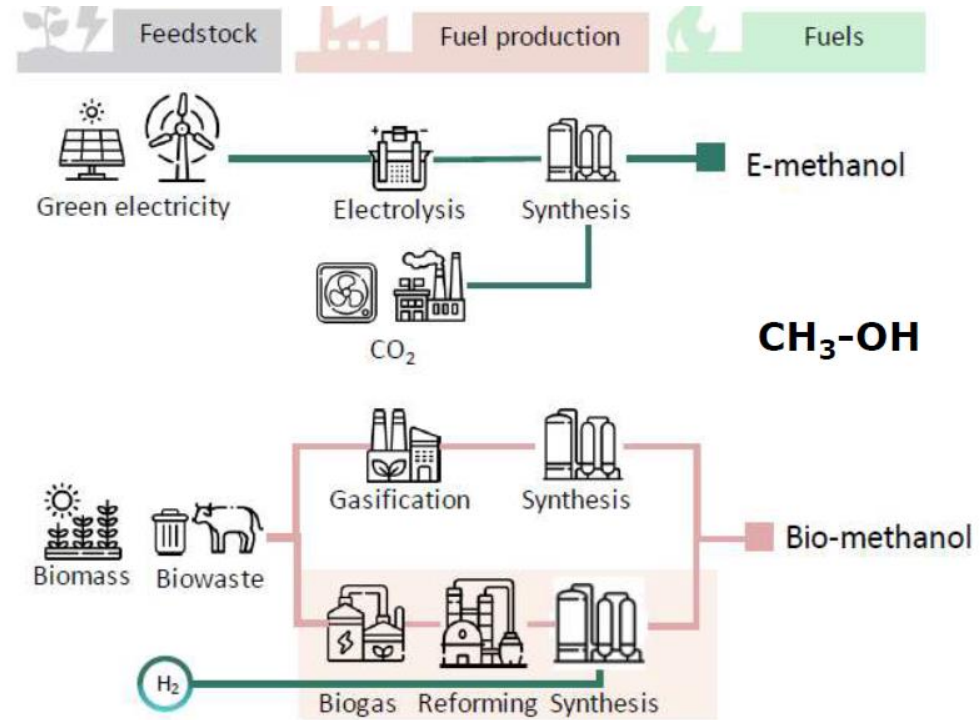
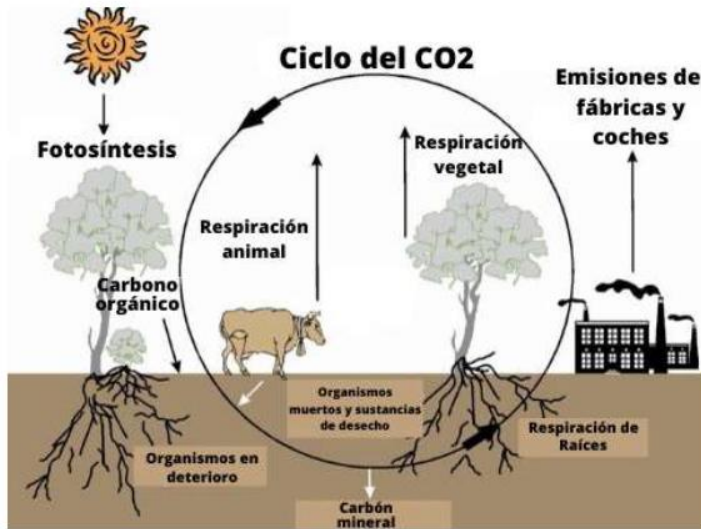


Source: values for the graph were taken from Well-to-Wake figures for 4-stroke (low pressure) dual-fuel engines using the global warming potential of methane of 100 years in the analysis from a short paper by Dr Elisabeth Lindstad (2019), chief scientist at SINTEF Ocean AS, Norway.

Types of alternative fuels. Hydrogen derivatives

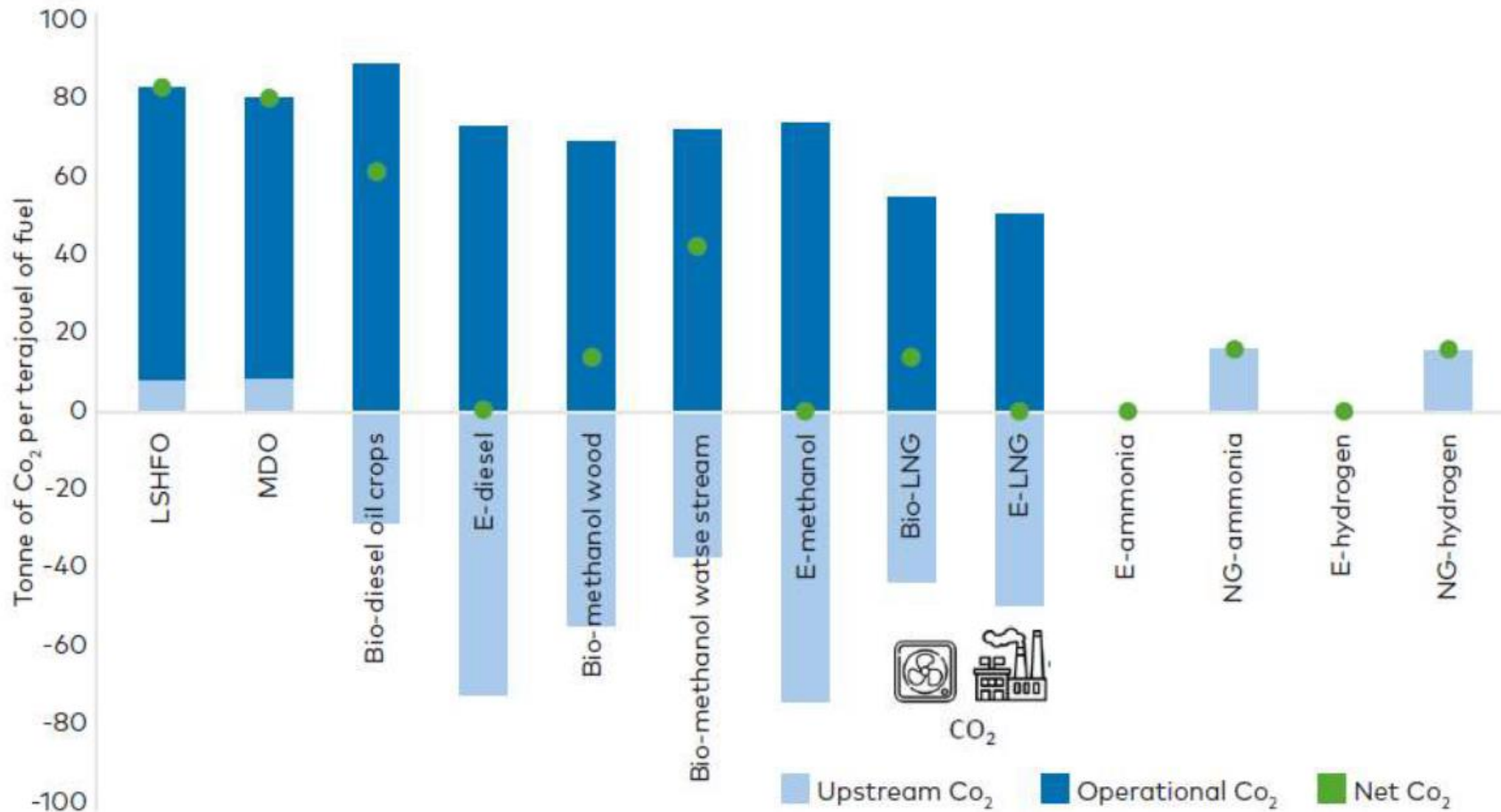


Types of alternative fuels. Hydrogen derivatives



	Terminology	Technology	Feedstock/ Electricity source	GHG footprint*
PRODUCTION VIA ELECTRICITY	Green Hydrogen	Electrolysis	Wind Solar Hydro Geothermal Tidal	Minimal
	Purple/Pink Hydrogen		Nuclear	
	Yellow Hydrogen		Mixed-origin grid energy	Medium
PRODUCTION VIA FOSSIL FUELS	Blue Hydrogen	Natural gas reforming + CCUS Gasification + CCUS	Natural gas coal	Low
	Turquoise Hydrogen	Pyrolysis	Natural gas	Solid carbon (by-product)
	Grey Hydrogen	Natural gas reforming		Medium
	Brown Hydrogen	Gasification	Brown coal (lignite)	High
	Black Hydrogen		Black coal	

* GHG footprint given as a general guide but it is accepted that each category can be higher in some cases.



Types of alternative fuels. Readiness.



MATURE
Solutions are available, and none or marginal barriers are identified..



SOLUTIONS IDENTIFIED
Solutions exist, but some challenges on e.g. maturity and availability are identified.



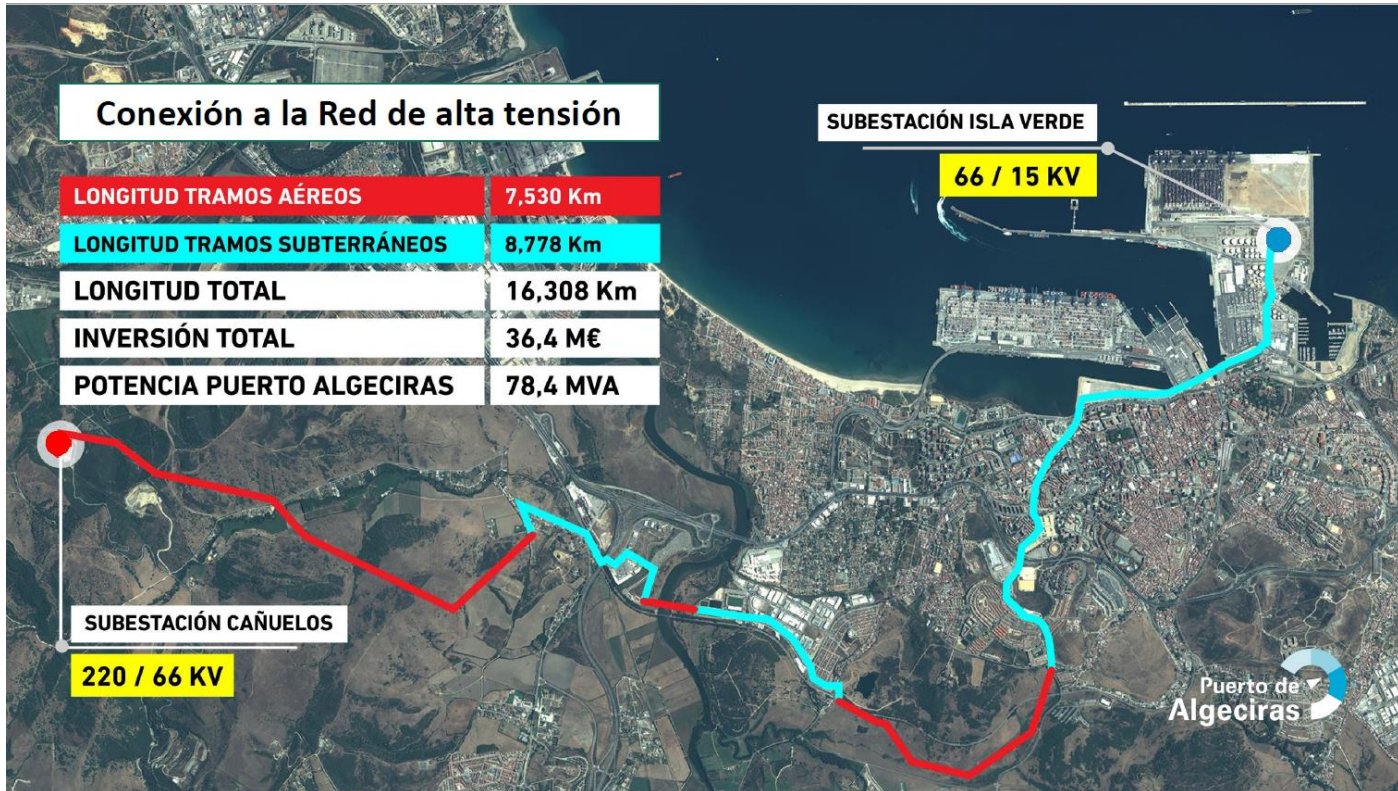
MAJOR CHALLENGES
Solutions are not developed or lack specification.

	Feedstock availability	Fuel production	Fuel storage, logistics and bunkering	Onboard energy storage & fuel conversion	Onboard safety and fuel management	Vessel emissions	Regulation & certification
E-ammonia							
Blue ammonia							
E-methanol							
Bio-methanol							
E-methane							
Bio-methane							
Bio-oils							



OPS

Supply from the substation. ➤



OPS

Internal GRID ➤



OPS

Next actions ➤



OPS

Final Scheme ➤

Esquema Tecnología OPS

Puerto de
Algeciras



BUQUE

**CAJA DE CONEXIÓN Y SISTEMA
DE GESTIÓN DE CABLES**

**ACONDICIONAMIENTO DE LA
ENERGÍA: TENSIÓN Y FRECUENCIA**

**ACOMETIDA A LA RED
DE ALTA TENSIÓN**

OPS

▶ PUERTO DE ALGECIRAS

DEMANDA 60 Hz

11 - 6,6 KV

18 MVA

DEMANDA 50 Hz

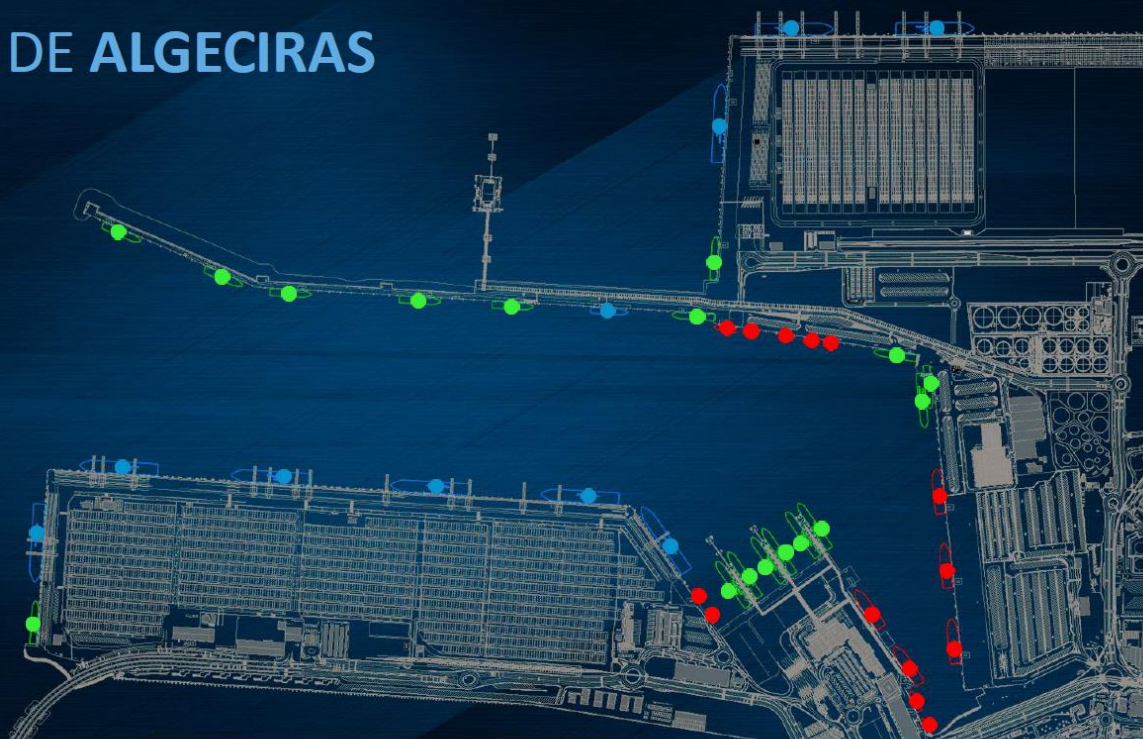
6,6 - 0,4 KV

16 MVA

INVERSIÓN

29,297,000 €

Puerto de
Algeciras

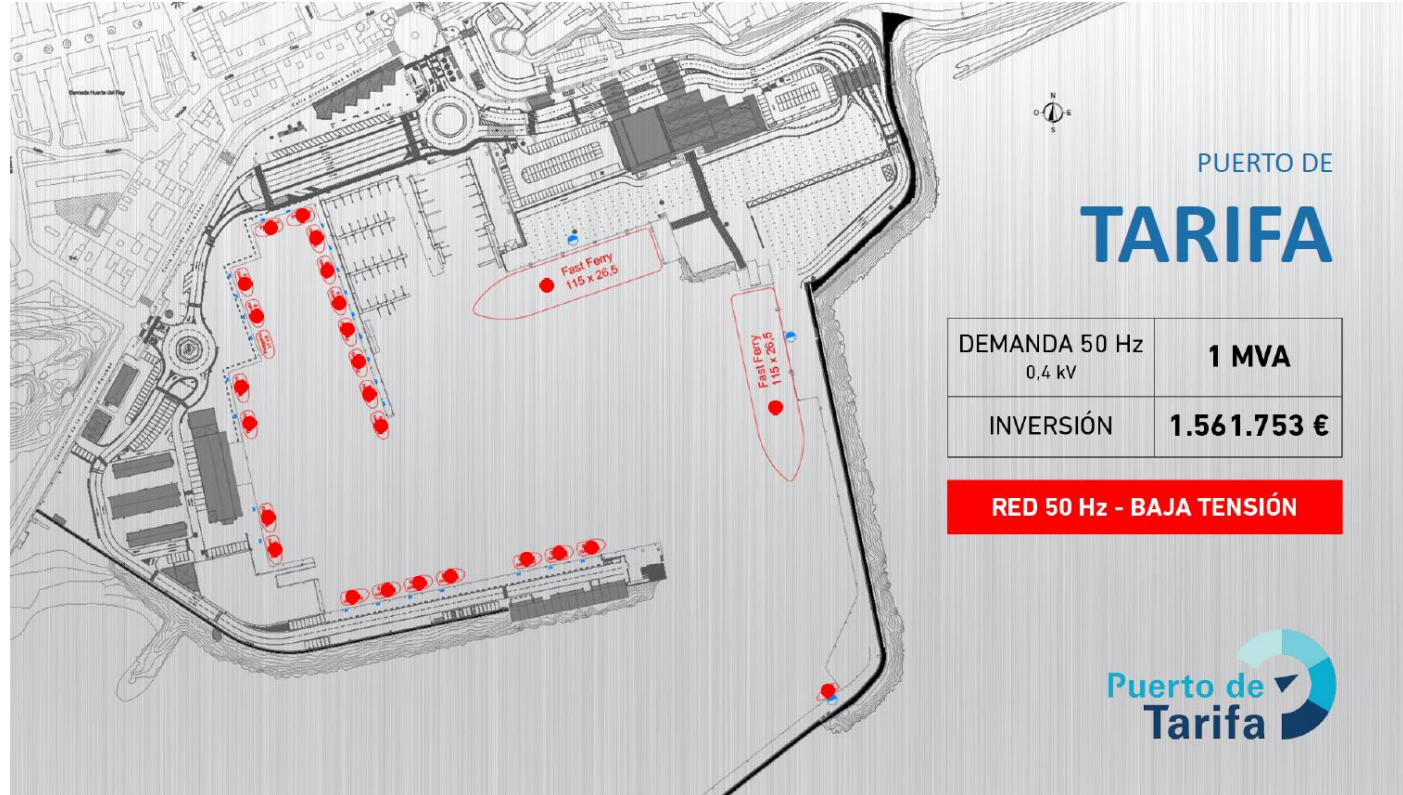


RED 50 Hz - MEDIA TENSIÓN

RED 50 Hz - BAJA TENSIÓN

RED 60 Hz - MEDIA TENSIÓN

OPS



Ammonia as an alternative fuel for ships

July 2022

Summary of 1H.2022 = Joint Study of Common Issues =



ITOCHU Corporation
Green Innovation Business Unit



Maritime transport emissions reduction

Getting to Zero Coalition

Accelerating maritime shipping's decarbonization with the development and deployment of commercially viable deep sea zero emission vessels by 2030 towards full decarbonization by 2050.



The Getting to Zero Coalition is a powerful alliance of more than 200 organizations including 160 companies within the maritime, energy, infrastructure and finance sectors, supported by key governments and IGOs.

LNG. Endesa initiative.



PROJECT DESCRIPTION

Construction of an LNG storage area in Algeciras Port, to supply LNG to vessels and bunker barges

Initial storage capacity: up to 10.000 m³. -

Phase 1: 4x1.000m³ -

Phase 2: up to 10.000 m³ depending on demand development -



BUDGET

Initial investments: 35,0 M€



TIME PLAN

Start date: 2021

First vessel: 2023



SOUTH QUAY AND SPACE FOR FURTHER STORAGE CAPACITY (FUTURE DEVELOPMENTS)

LNG supply vessel



PROJECT DESCRIPTION

Newbuild bunker vessel with 12,500 m3 storage capacity will deliver LNG on Algeciras Port.



BUDGET

Project: 56 M€



TIME PLAN

Start operational date: 2020/23



Biofuels. EVOS Expansion



PROJECT DESCRIPTION

New storage and delivery facilities for biofuels (biomethanol, biodiesel, HVO) and feedstock in Algeciras Port, to supply local demand and potential bunker (biofuels/methanol).

Additional Capacity feedstock: up to 35k m3.

Additional capacity biofuels: up to 65k m3.



BUDGET

Storage and delivery facilities: 50 M€

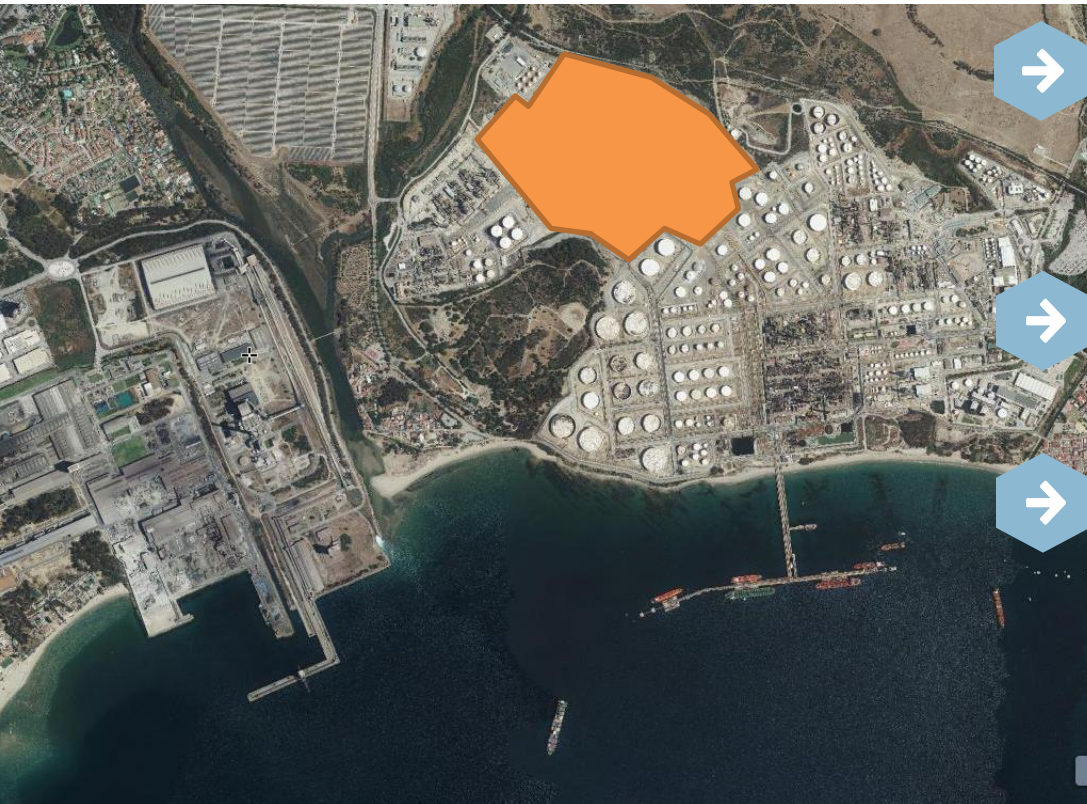


TIME PLAN

Start operational date: 2025/26

EVOS

Production of green hydrogen and derivatives



PROJECT DESCRIPTION

Construction of a Green H₂ production plant in Algeciras Port, to supply local demand, export and bunker (ammonia/methanol).

Capacity: up to 1.000 MW.

BUDGET

H₂ Production: 3.000 M€ (Andalucía)

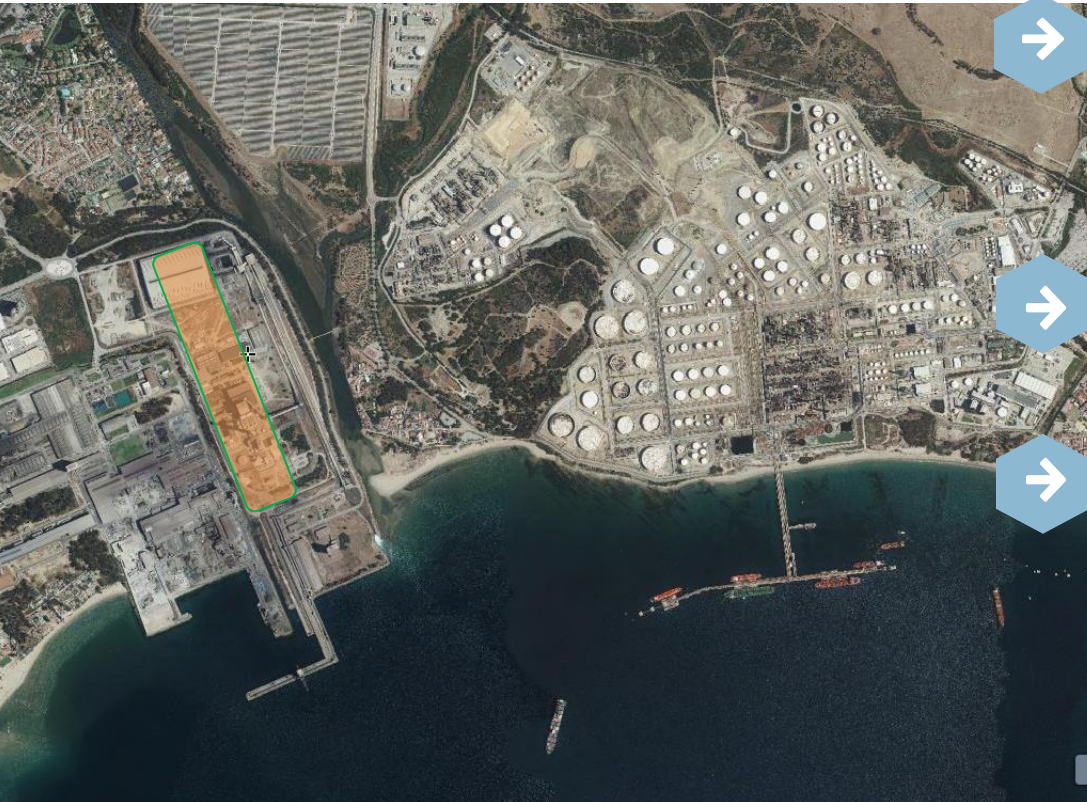
Renewable electricity (3 GW): 2.000 M€

TIME PLAN

Start operational date: 2027



Production of green hydrogen and derivatives



PROJECT DESCRIPTION

Development of a Green H₂ production plant in Algeciras Port, to supply local demand, with significant scale-up potential.

Capacity: 100 MW under development, with potential of over 500 MW.

BUDGET

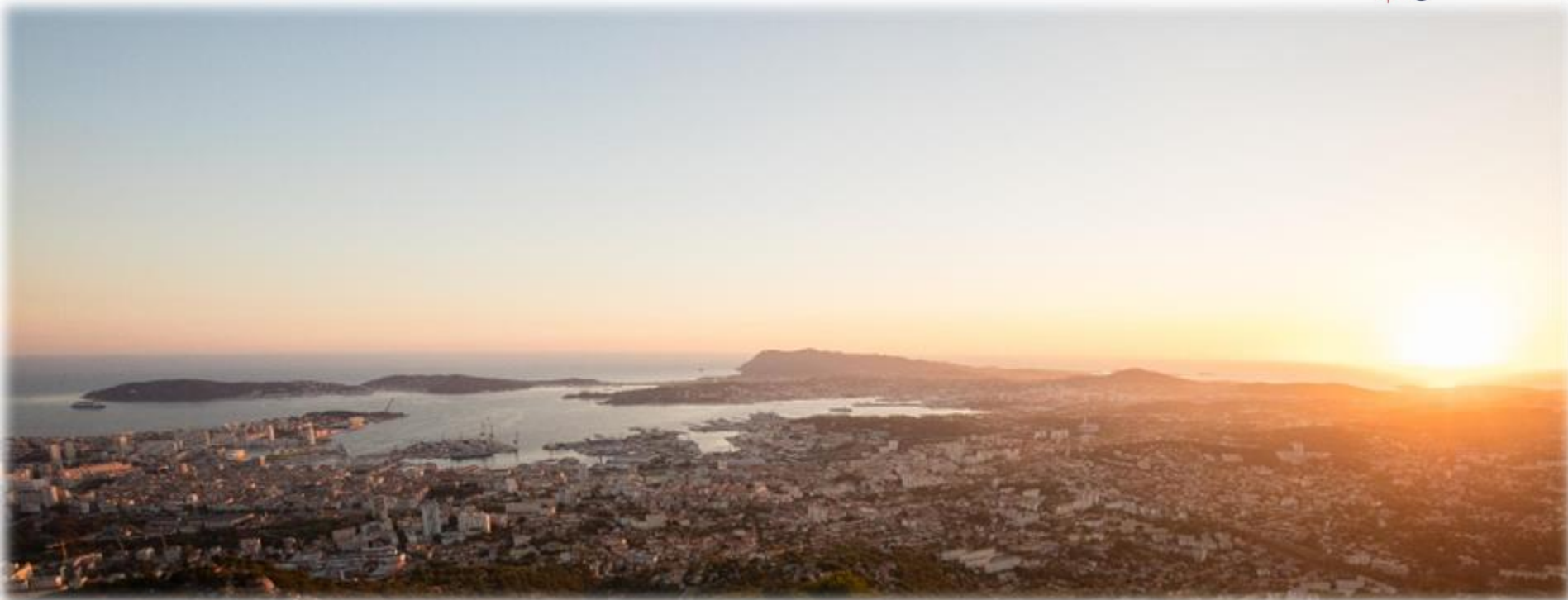
H₂ Production: 140 M€

Renewable electricity: 200 M€

TIME PLAN

Start operational date: 2025 for the first 100 MW and potential to grow post-2027 to >500 MW





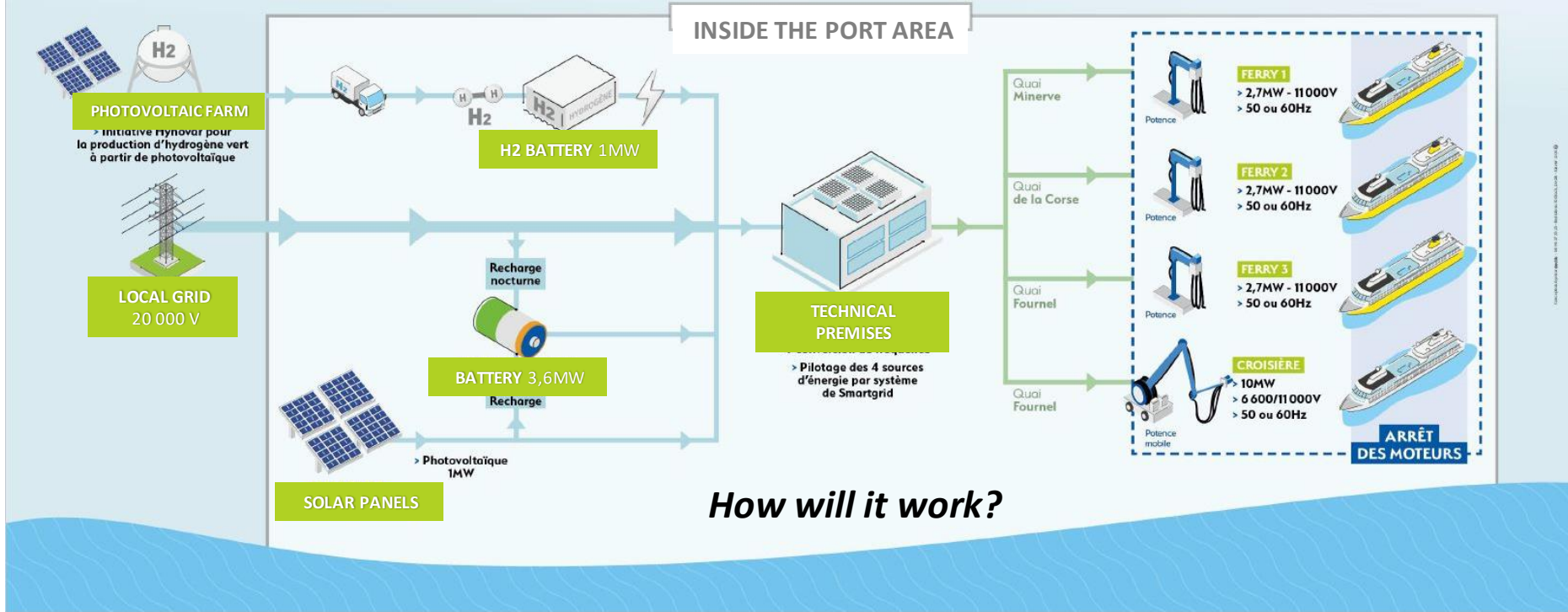
Ports of Toulon Bay



Working on...

- Decarbonization of Maritime Transport in the Mediterranean ✓
- Alternatives fuels for the Maritime Sector / Green Hydrogen ✓

Works are currently under completion => **OPS will be operational by spring 2023**

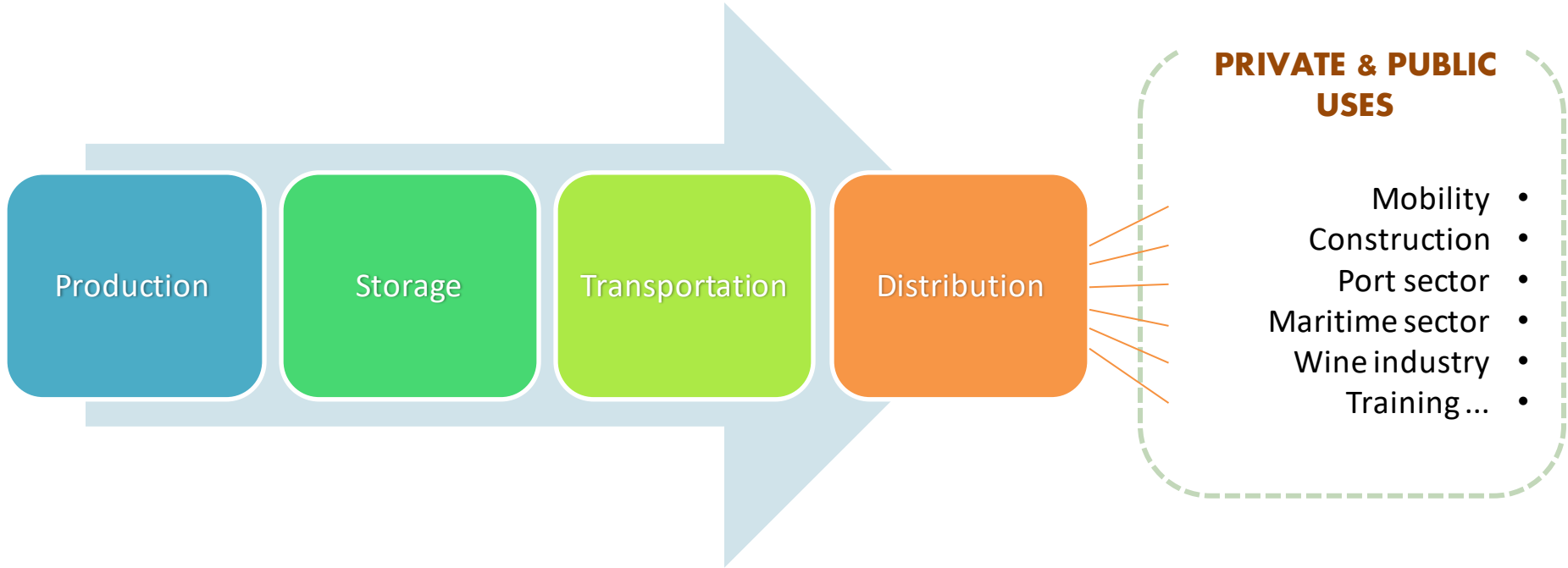


How will it work?



An energetic mix combining local grid together with hydrogen and photovoltaic

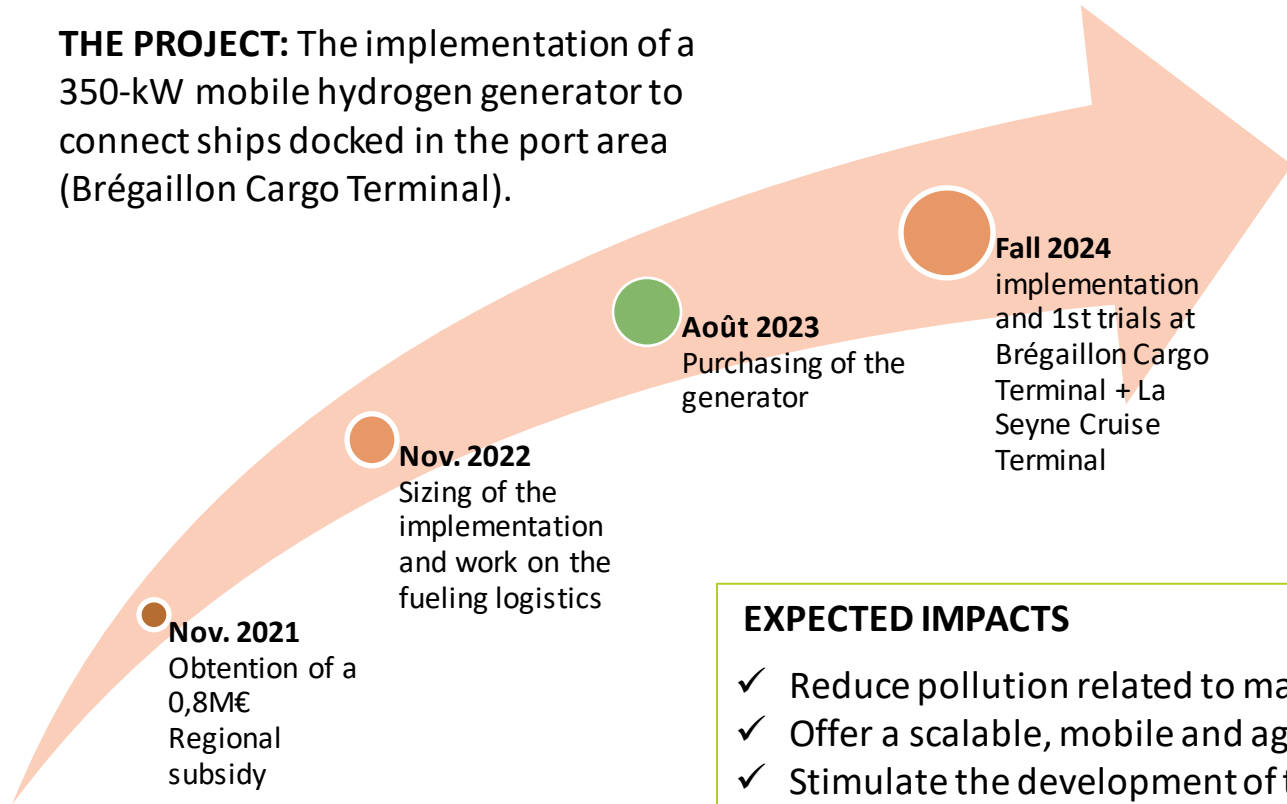
Hydrogen value chain & local ecosystem



An example of port use in Toulon Bay

the « standbhy » project

THE PROJECT: The implementation of a 350-kW mobile hydrogen generator to connect ships docked in the port area (Brégaillon Cargo Terminal).



USAGES PRIVÉS & PUBLICS

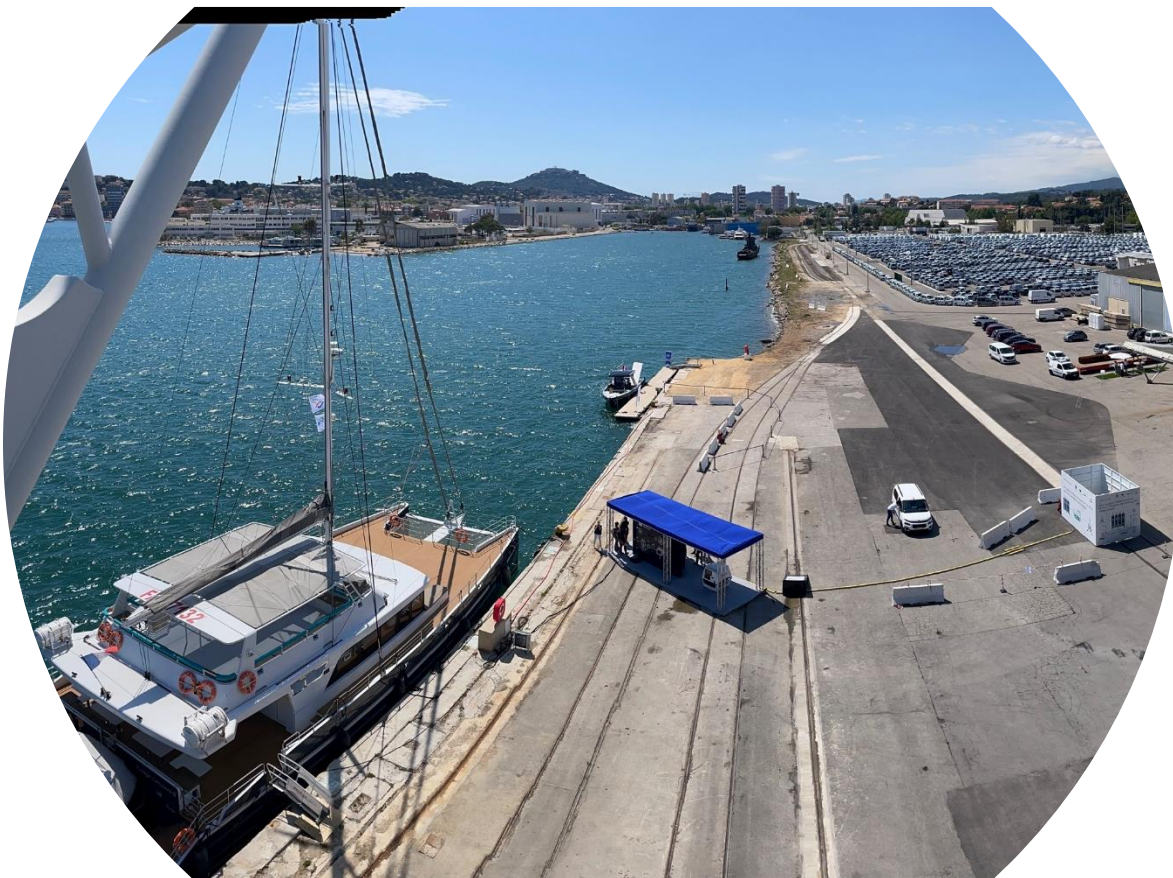
- Mobilité
- BTP
- Secteur portuaire
- Domaine maritime
- Domaine viticole
- Formation ...

EXPECTED IMPACTS

- ✓ Reduce pollution related to maritime activity
- ✓ Offer a scalable, mobile and agile solution for isolated terminals
- ✓ Stimulate the development of the hydrogen industry



An example of port use in Toulon Bay



Le projet
« StandbHy »



An innovative project that brings together Public and Private sectors

HYNOMED was created in 2020, as a result of a Public/Private Partnership, including Engie Solution, the Chamber of Commerce and Industry and Caisse des Dépôts et Consignations (Public Bank).

The company is setting up a green H2 production and distribution station (400 kg/day) inside the Brégaillon Cargo Terminal, which will be used to supply H2 micro-systems, for both maritime and land uses.



This model can be duplicated on site (possibility of increasing to 800 kg / day) and throughout the territory.

HYNOMED

Thank You