





Overview of Barcelona Port



Highly Diversified



Well connected



Innovation culture



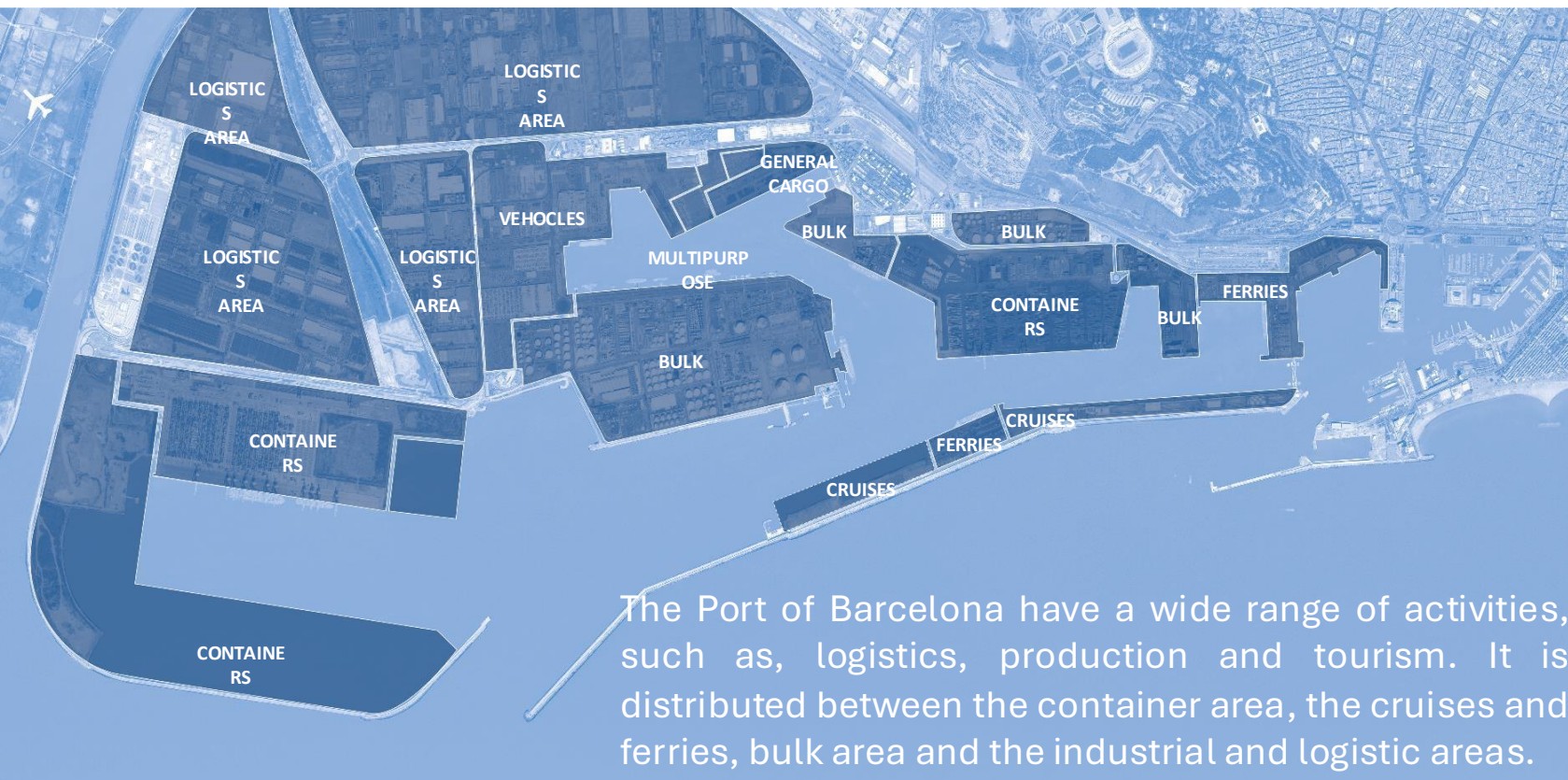
All means of transport



Hinterland terminals

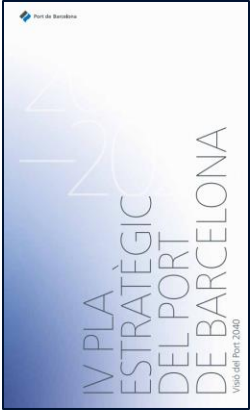


Short Sea Shipping i sea highways



The Port of Barcelona have a wide range of activities, such as, logistics, production and tourism. It is distributed between the container area, the cruises and ferries, bulk area and the industrial and logistic areas.

▮ Purpose and background of the plan



- The Energy Transition Plan (PTE) is the roadmap that establishes the strategy to decarbonise port activity and promote sustainable economic development.
- It derives from the **2021-2025 Strategic Plan**, which placed sustainability at the heart of the port strategy
- The document will set out the port's energy policy until **2040** and sets out the vision for **2050**. This policy will have an **impact on a** **ons**.
- It is a tool for the port as a whole; Close co **actors in** the port community is essential (concessi **administrations, etc.**).

Press Release: [The Port of Barcelona's Energy Transition Plan](#)
[Barcelona](#)

Energy Transition Plan document: [Energy transition | Port de B](#)

2021-2025 Strategic Plan document: [Evolució estratègica del](#)



[Port de](#)

Principles and motivation

Trends

1. Climate change



2. Disruption



3. New energy paradigm



4. Innovation



Motivators

Technological leadership Environmental awareness

Global energy
paradigm shift

Economic resilience
and growth



Community
engagement and
collaboration

Adaptive
management to
climate risk

Principles and motivation

Guiding principles



Contribute to the reduction of global temperature increase



Energy, sustainable and as a strategic factor



The Port of Barcelona as an Energy HUB

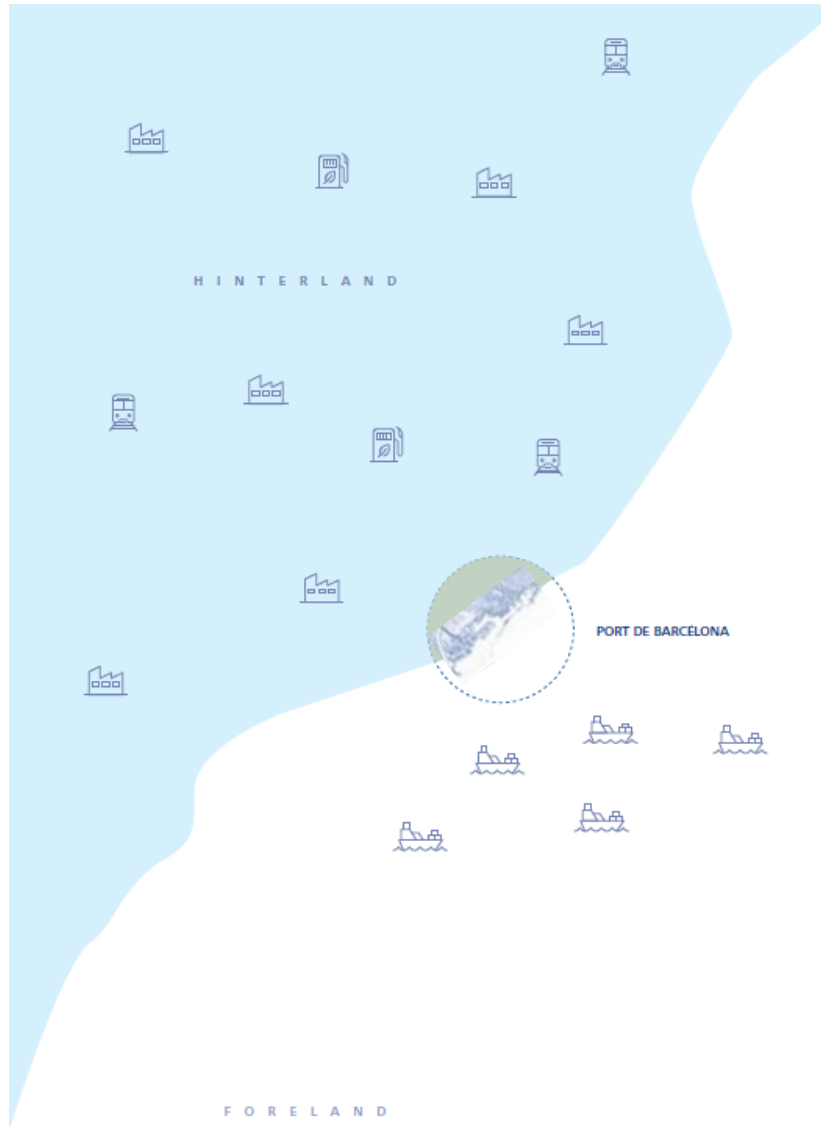


Ensuring competitiveness

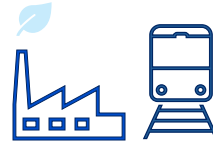


Leadership in the logistics chain

Scopes of action



Hinterland



- Availability of green energy
- Improved air quality
- Reduction of transport emissions

Port of Barcelona



- Improved air quality
- More resilient energy system
- Decarbonization

Foreland



- Network of port terminals
- Green Maritime Corridor
- Supply chain

▮ Strategic framework

Mission

To guarantee the supply of energy to the port community, facing the objectives of environmental and economic sustainability.



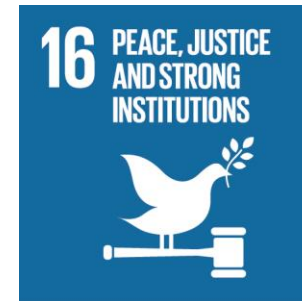
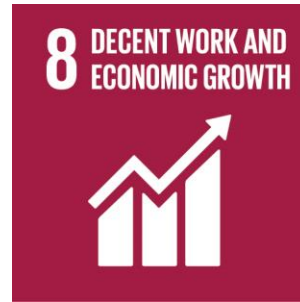
Vision SMART ENERGY HUB

To become a leading centre of energy activity in Southern Europe, where both logistics and innovative business models can thrive thanks to the offer of decarbonised and sustainable services and the guarantee of a competitive energy supply– **Connected to Europe and to the World**



Relevant Sustainable Development Goals

The Energy Transition Plan tends to contribute to next SDG's:





Role of the APB & relevant actors



Facilitator

Holistic vision, establishing contacts, coordinating actors, acting as a moderator of collaborative projects



Promoter

Subsidize sustainable change, provide information services (ICT) and secure data sharing spaces



Enabler

Establishment of regulations and development of energy infrastructures to enable the adoption of new fuels and electrification



Developer

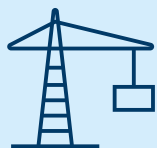
Planning the necessary activities, participating in pioneering projects, conveying access to innovation funding and providing regulated testing spaces



Investor

Invest in strategic projects to become a leading port in sustainable energy transformation

The energy transition is a choral effort of the entire port community of the Port of Barcelona



Terminals i concessions

Optimització, eficiència energètica, electrificació, combustibles verds



Línies marítimes

Adopció combustibles verds, eficiència, OPS, sincronització, corredors verds



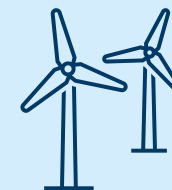
Transport terrestre

Transformació energètica (e-, AF,), eficiència, control flotes, digitalització, multimodalitat (SSS i ferroviari)



Agents logístics i cargo owners

Polítiques i objectius de sostenibilitat, digitalització, scope 3, serveis logístics avançats, coneixement petja CO2, bonificacions,...

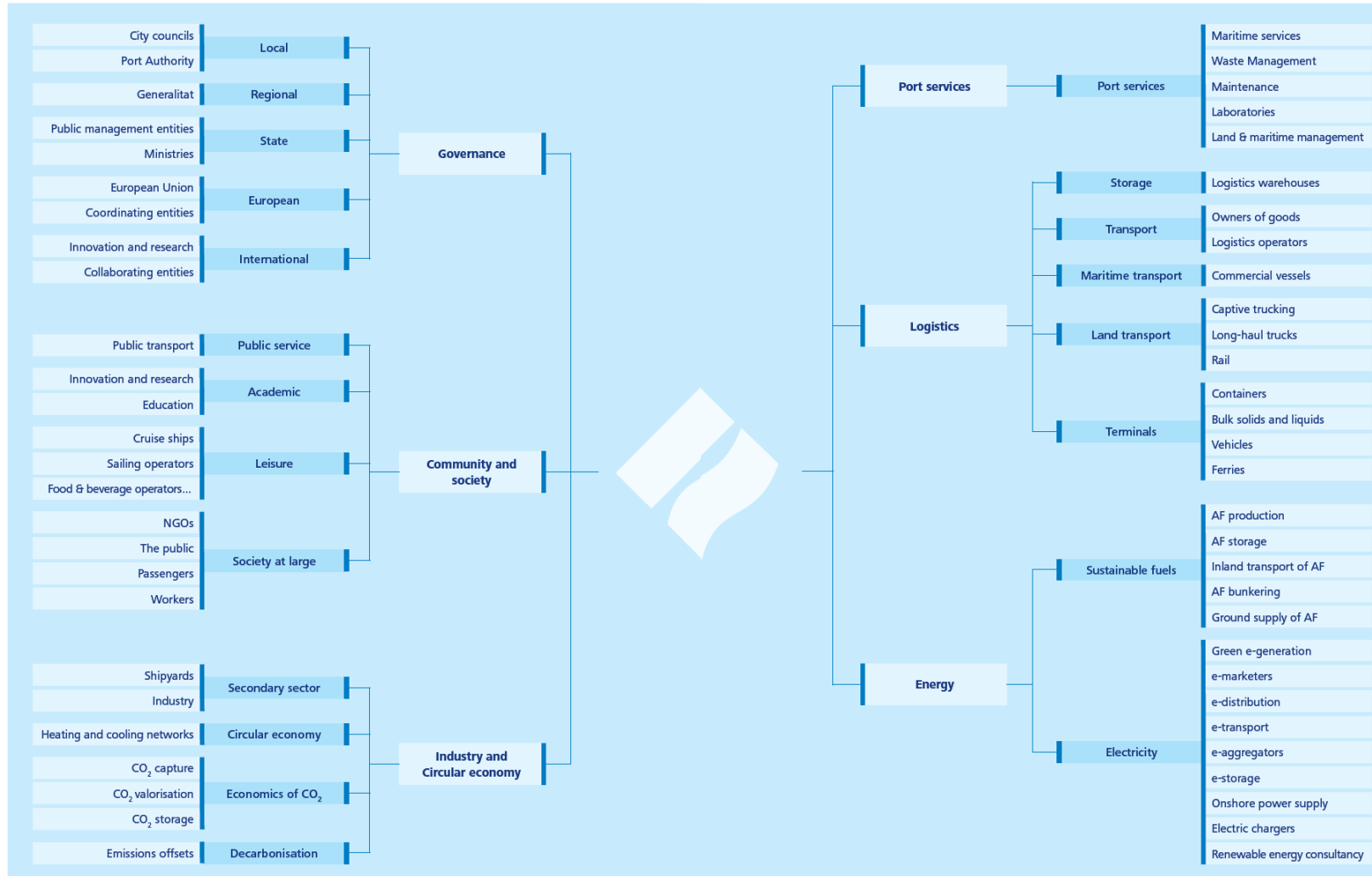


Energètiques

Cadenes de producció i subministrament, emmagatzematge, bunkering, flexibilitzar distribució, inversions, EMS, resiliència.

Actors mapping

The scope of the plan is not limited to the Port Authority, rather it encompasses the entire port community and even goes beyond, seeking to impact both the hinterland and the foreland. Therefore, a large part of the plan's actions will have to be led by actors from the port community. It is essential to seek the collaboration of the stakeholders to get to know their objectives and barriers, and to determine their relevance for successfully developing the plan.



Strategic objectives



Decarbonization

Becoming a carbon neutral port by 2050, achieving a net-zero balance in emissions

OTEDC1: Emissions Management



Reducing emissions of the Port

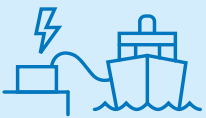
- 50% al 2030
- 85% al 2040
- 100% al 2050

OTEDC2: AF Adoption



Encouraging the adoption of low-emission fuels

OTEDC3: Implementation of OPS - NEXIGEN



Deploy OPS Plan Nexigen

- 65% of ship calls connected to OPS by 2030
- 90% of ship calls connected to OPS by 2050



Sustainability

Reduction in overall port energy consumption

OTESO-1: Promoting the increase in energy efficiency



Electrify 50% of the activity port by 2030

OTESO-2: Promotion of sustainable transport

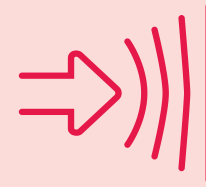


Increase the railway quota with the new accesses and terminals for 2035

OTEDSO-3: Promoting the circular economy



Promoting the circular economy revaluing 40% of the by-products by 2035



Resilience

Maximize the port's energy independence

OTERC-1: Renewable e- generation linked to the port



100 MWp installation photovoltaics by 2030

OTERC-2: Implementing a SEMS



Smart Energy Management System (SEMS) implanted by 2030

OTERC-3: Establishment of Afs production plants



Production of 100,000 tons of Sustainable fuel by 2030



Innovation

Unlock new business models to become a clean energy hub

OTEIE-1: Developing the Alternative Fuels Supply Chain



Developing the supply chain of alternative fuels

OTEIE-2: Supporting access to innovation finance



Facilitate the establishment of Maritime Green Corridors

OTEIE-3: Developing the hydrogen economy



Developing the hydrogen economy in the port environment



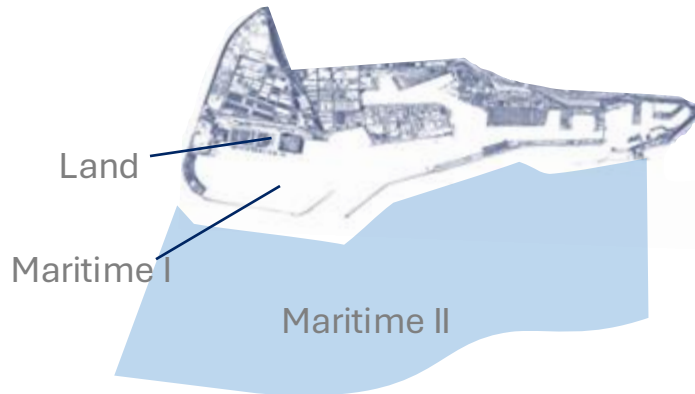
ETODC-1: Emissions management

Active management of the emissions generated in the port is essential to move towards a more sustainable future. This means measuring emissions accurately, ensuring that the measurements are reliable, incorporating digital technologies and integrating them into decision-making.

Programmes:

- Mainstreaming environmental Sustainability
- Digitalisation of consumption, emissions and calculators
- Port energy management system
- Low – emissions certificate system

Flagship project:



Link of interest: [The carbon footprint of the Port of Barcelona | Port de Barcelona](#)



Scope

- Emissions within the **DEUP**
- Internal Subject of the inventory → Establishing the **Port** and not the Port Authority.
- covers the emissions of port activity
- **Future scope:** Feed scope 3 with stakeholders inventories, essential for making supply chain emissions visible.

Methodology

- Certified according to **ISO 14064** by DNV & Bureau Veritas

Bottom-Up approach

- Real data from port actors obtained to quantify the emissions.
- Where not possible to apply → close collaboration with the stakeholders to estimate consumptions (i.e. vessels).

Collaboration






- The port ecosystem has shown great interest
- Port community has been key to achieve such a broad scope.
- The port as a whole has been promoting collaboration for a long time.



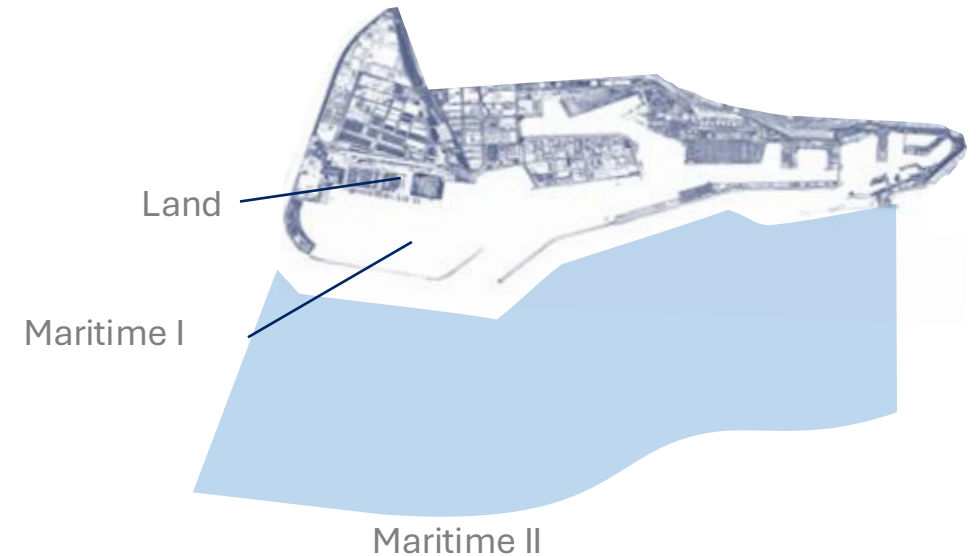
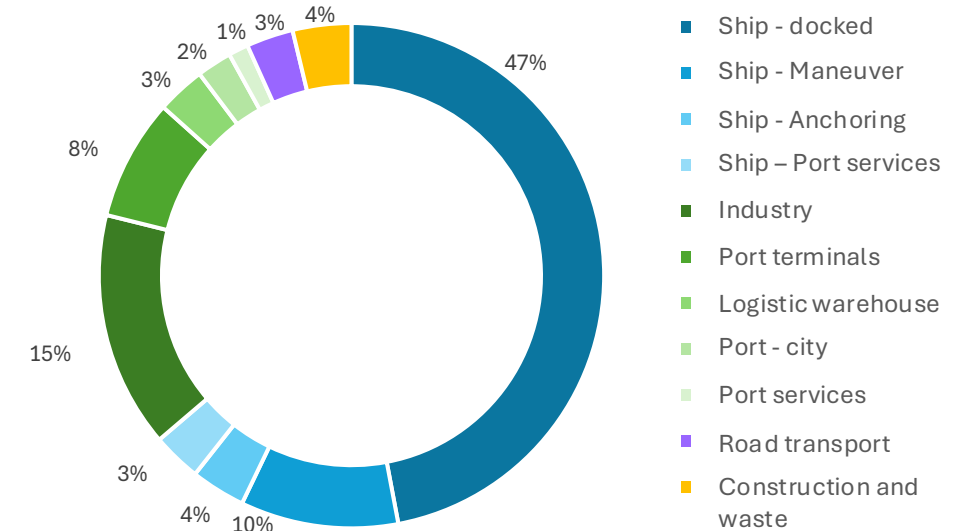


ETODC-1: Emissions management

It has been developed by establishing the Port and not the Port Authority as the subject of the inventory, internalizing the emissions of port activity, thus giving the appropriate weight to the emissions of ships and terminals.

TONS OF CO ₂ -EQ RELEASED				
				
Ships 315,619	Concessions 145,658	Land transport 14,869	Waste 11,417	Construction 7,155
At berth 232,795	Industrial 74,800	Terminals 11,312	Marpol 11,417	Materials 4,530
While manoeuvring 50,028	Terminals 44,227	Passengers / employees 2,845		Consumption 2,260
While anchored 17,294	Port city 11,271			Transport 365
Auxiliary 15,502	Logistics 9,058	Railway 711		
	Port services 6,302			

TOTAL emissions CO₂eq for activities [tn]



EMISSIONS BY TYPE OF ENERGY SOURCE



Source: APB



ETODC-2: Adoption of low-emissions fuels

Transport in the port is still largely dependent on fossil fuels. Replacing them with more sustainable options, such as LNG or methanol, would help reduce emissions. The plan therefore promotes incentives and infrastructure facilitating adoption of these fuels.

Programmes:

- Decarbonisation of port machinery
- Sustainable navigation
- Incentivise truck fleet changeover
- Ships linked to sustainable port services

Flagship project:



- Funding of straddles carrier for Hutchison BEST terminal
- 38 pieces of fully electric container equipment (26 shuttle carriers)

[Press Article: link](#)

- 2025 – Electric straddle carrier pilot in APM Terminal
- In collaboration with Konecranes and ZPMC



New rebates scheme: Provide incentives for more sustainable ships that use green fuels in port call.



Externalities mitigation at Port

FCA

Apply a correction factor (0.2–1) to commercial rebates based on emission impact per “ESI at Berth”



Encouraging a change in the energy paradigm

AFP
BAF

Use of AFs in the port
AFs Bunkering at port by Shipping company



Collaborate in the sustainability of the global fleet

NMS

Navigation discount linked to ESI

ETODC-2: Adoption of low-emissions fuels

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Programs:

- Decarbonisation of port machinery
- Sustainable navigation
- Incentivise truck fleet changeover
- Ships linked to sustainable port services

Flagship project:

Strategy on Green Shipping Corridors

GSC aligns with our Strategic Plan

Economic sustainability	Environmental sustainability	Social sustainability
Diversifying port activity Develop the necessary infrastructures	Developing a new energy model Decarbonisation of maritime port activity	Promote the creation of new jobs with high added value

Barcelona Green Cruise Corridor

One initial cruise ship bunkering green methanol from 2026, a second ship being prepared.

Developed by Maersk McKinney Moller Center for zero carbon shipping, Port of Barcelona a fuel producer and a Cruise line.

Shanghai – Barcelona Car carrier corridor

Agreement on the deployment of car carriers operating with green methanol to ship electric cars from China to Europe.

Involvement of both port authorities (SIPG & APB), Chery, Cupra, China Merchants RoRo and AICC among others.

Press Release: [The ports of Barcelona and Shanghai sign an agreement to strengthen their relationship and create a green corridor | Port de Barcelona](#)

ETODC-3: Implementation of the OPS - NEXIGEN

Electrification is key to decarbonization; the onshore power supply system (OPS) allows ships at berth to stop using auxiliary engines. To make this possible, a new electricity grid needs to be deployed in the port area to ensure the capacity and reliability of supply.

- Programmes:**
- Infraestructure development
 - Creation of an OPS management company
 - Operation of OPS systems
 - Electrification of wharves
 - Governance and financing for NEXIGEN

Flagship project:

NEXIGEN



- Development of a new electrical grid directly connected to the TSO with a capacity of 80 MW amounting over 120M€ in budget.
- On 2027 two more cruise terminals will be connected.
- 65 % ship calls electrified by 2030
- 90% ship calls electrified by 2050

Current deployment:

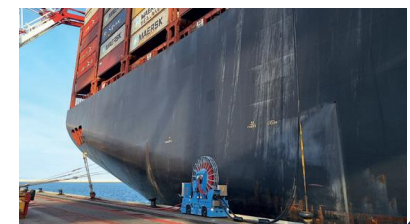
Ferry Terminal

- **572 MWh** Electrical energy supplied (2024)
- Saving up to **2090 tones** of CO2 equivalent per year



Containers Terminal

- **4.089 MWh** Electrical energy supplied (2024)
- **8 MW** of power
- Connections to MSC, CMA and CGM
- **54h mean connection (91 max)**



ETOSU-1: Promote increased energy efficiency

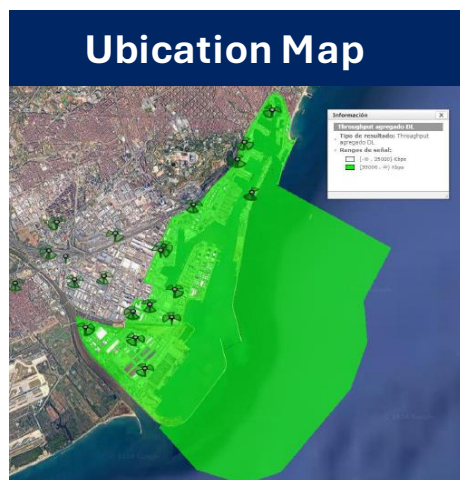
Energy efficiency makes it possible for the port to reduce consumption without affecting its activity, save materials and resources, and contribute to a more sustainable activity. Electrification and process optimization through digitalization help to reduce emissions and operating costs.

- Programmes:**
- Promote the electrification of port activity
 - Energy regulation
 - Incentivise energy efficiency measures
 - Digitalisation, interconnection and autonomous vehicles

Flagship project:

Development of a 5G grid, a critical infrastructure for the Port, enabling reliable communications, real-time operation, security, IoT and automation. It provides low latency and scalability to drive efficiency and future competitiveness

In collaboration with [Pioneers](#) (link)

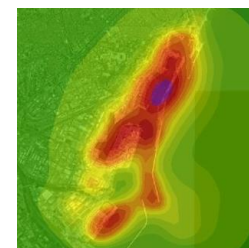


5G Infrastructure as a service: 5G scalable grid

100 % outdoor signal Indoor + 2 miles

Interconnection with rescue for national roaming

Grid accessible to third-party users



IoT environmental monitoring



Piezometers



Smart buoy



IoT acoustic monitoring



PV monitoring



OPS SmartGrid

ETOSU-2: Promotion of sustainable transport

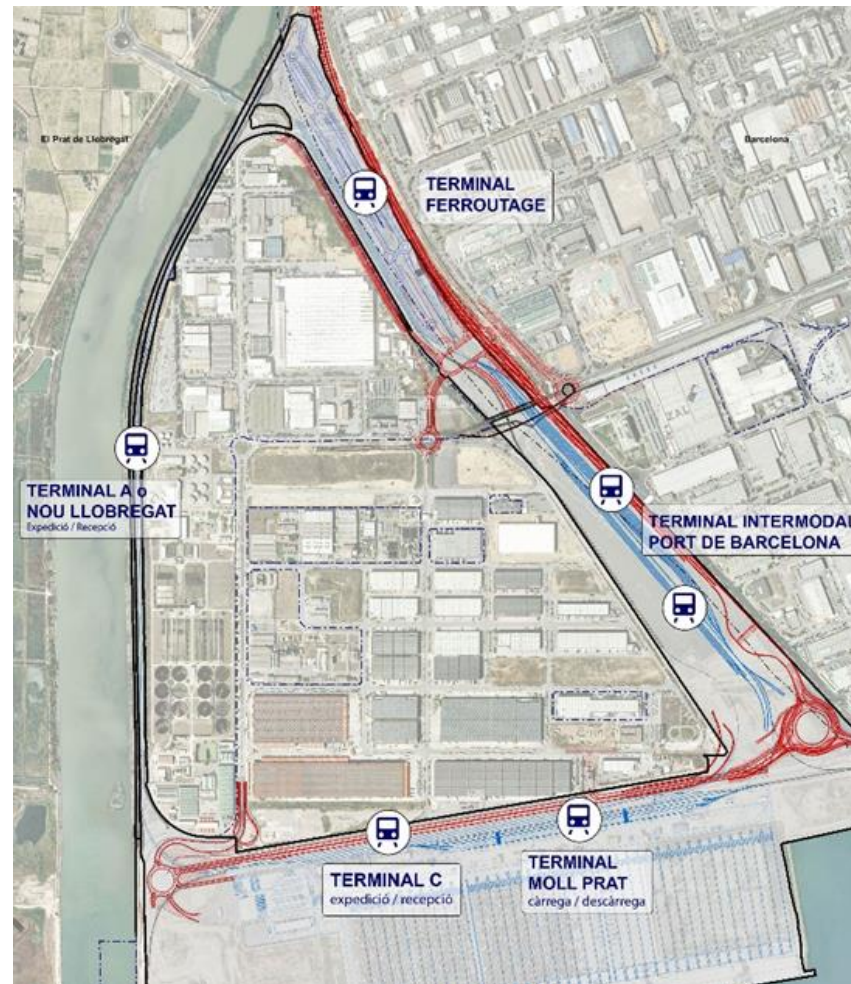
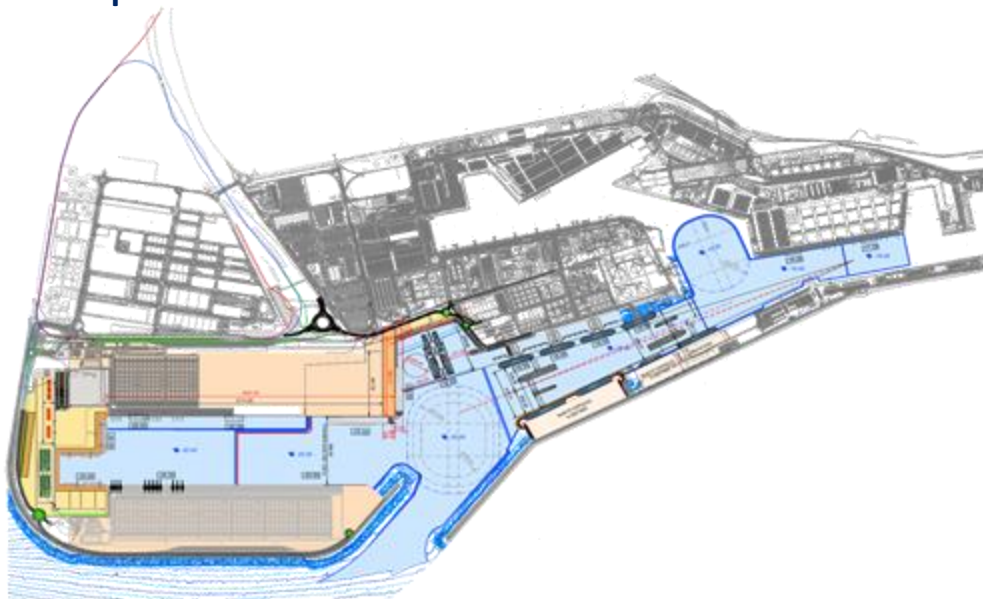
Increased use of the intermodal transport network, by improving the use of rail and other sustainable alternatives such as motorways of the sea and public transport, reduces energy consumption, noise pollution and land use.

Programmes:

- Increase of rail intermodality
- Synchromodality
- Reinforcing the motorways of the sea / SSS
- Improving mobility in the port

Flagship project:

Global infrastructure plan: all container activity will be moved to the south, further away from the city, and new rail&road access will be built. A total of 4 new rail terminals will be developed.



From now to <2030: New railway and road accesses – 3 new rail terminals directly connected: Europe and National grid

Increasing railway sharing from 15% to >30%

A new company has been created, TRAINPORT, participated by ADIF, the rail infrastructure operator, and the Port Authority. It has allowed the unlocking of the new rail connection.

ETOSU-3: Promotion of the circular economy

Transforming by-products into resources for other processes, thereby reducing waste and the need to extract new raw material, can help manage the waste that has been generated, such as MARPOL V garbage from ships, while thermal resources as waste heat/cooling can also be harnessed

Programmes:

- Waste heat/cold recovery
- Revalorisation of port by-products
- CO2 value chain
- Improvement of the water cycle

Flagship project:

Cold grid from LNG regasification

Ecoenergies, a company to vehicle the collaboration on circular economy of the Municipality of Barcelona and Veolia has developed a heat and cold district for the industrial and logistic cluster of the Port and Zona Franca.

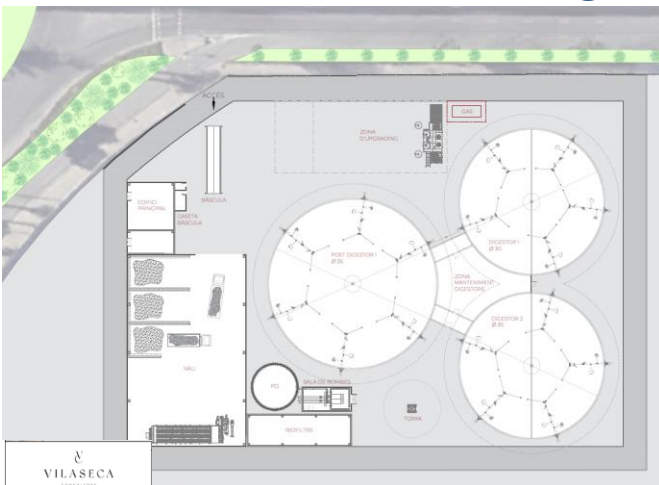


- Providing service to an area of **15.000.000 m²**
- **Reuse of residual cooling** (up to 30 MW) from LNG generation at the port
- **320 MW cold accumulation**

Press release : [link](#)

<https://www.ecoenergies.cat/es>

Bio methane from Cruise organic MARPOL



A new company formed by a waste operator, a technology provider and the Port Authority will be set up to build and operate a plant that will produce bio methane and biogenic CO2 from the organic waste discharge by the cruise ships, reinforcing their sustainability.



Potential production of biomethane:
10Mm³/year

Press release: [El Port de Barcelona estudia construir una planta de biometano para suministrar combustible limpio a los barcos | Port de Barcelona](#)



ETORE-1: Renewable e-generation linked to the port

In order to cope with the increased energy demand resulting from electrification, local renewable electricity generation will be developed. The port area will focus mainly on solar energy, while wind energy collaborations are being promoted in the hinterland.

Programmes:

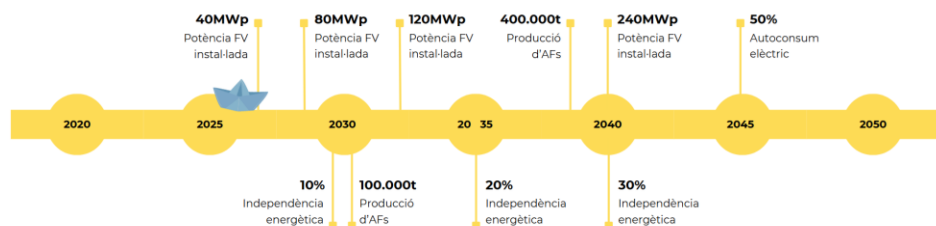
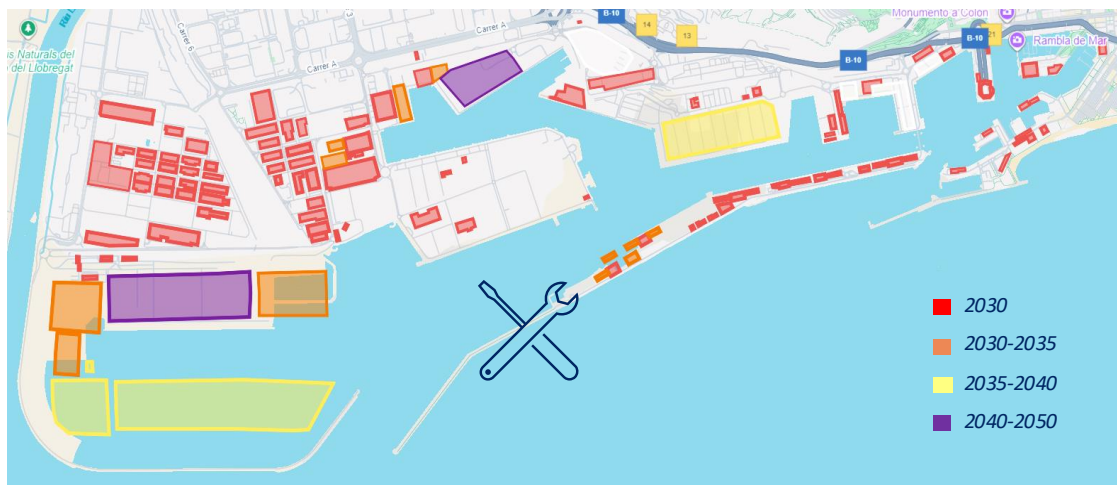
- Barcelona Port as Energy manager
- Implementation of photovoltaic panels in the port
- Enable new renewable energy sources
- Post related energy development

Flagship project:

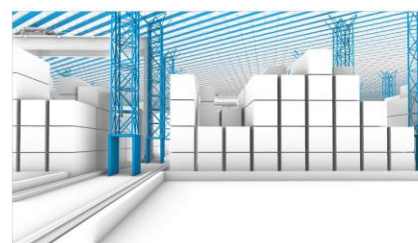
Public-private consortium formed by various stakeholders



- Development of the PV facilities
- Retailer
- Operation and maintenance



Parking canopies



Terminals canopies



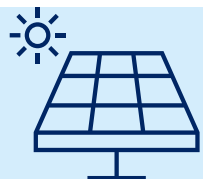
Installation of 100 MWp of photovoltaic for 2030. Potential of 500 MWp.

Link of interest: [Renewables | Port de Barcelona](#)



PROJECT SUNPORT

Zona d'Activitats Logístiques (ZAL)

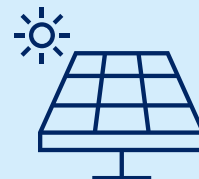


37 MWp

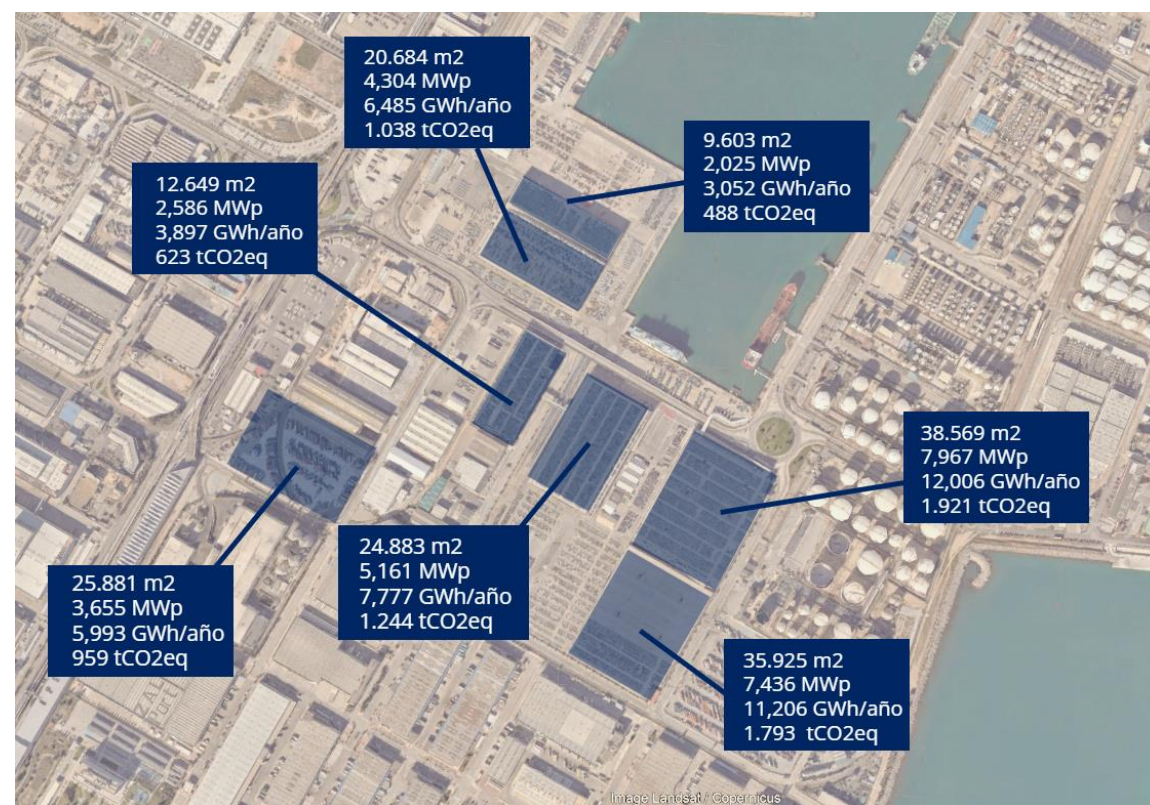


17.5 MWh

Car Silos



~ 36 MWp





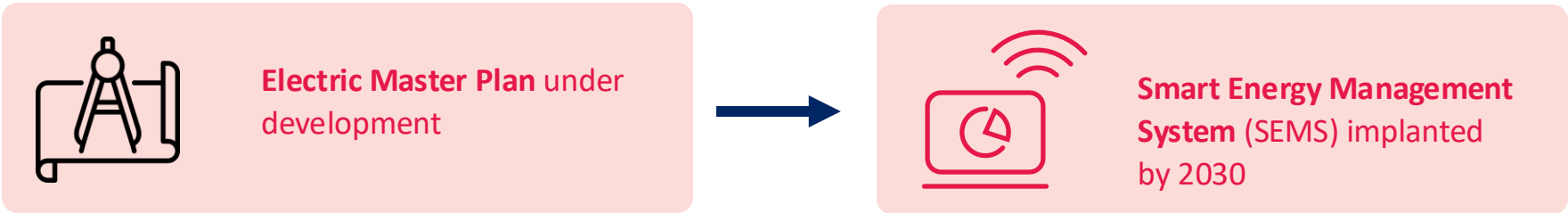
ETORE-2: Implementation of an intelligent energy management system

Create a smart energy management system makes better use of the energy generated, increases efficiency and sustainability, and maximises profits, while promoting self-consumption, competitiveness and cooperation between concessions.

- Programmes:**
- Develop intelligent energy management system in the port sector
 - Develop the port sector's proprietary
 - Energy flexible measures
 - Maximise port self-consumption

Flagship project:

Creation of an Electric Master Plan to design, adapt and modernize the actual grid of the port to new agents of the electrical grid, such as storage, renewable generation, new consumptions or flexible demand response coordinated through a **Smart Energy Management System (SEMS)**.



(De Rosa et al. 2024)





ETORE-3: Establishment of new fuels plants linked to the port

The local production of alternative fuels (AF) will guarantee the supply to ships, attract more sustainable fleets and make the port more attractive. This also increases energy independence and reduces risks associated with economic and geopolitical crises.

Programmes:

- Local production of biofuels
- Local production of green methanol
- Availability of raw materials
- Sustainable fuels in the hinterland with a link to the port

Flagship project:

New concessions

Plant for the production and supply of alternative fuels

- Project already submitted by HyFive (Hymet) to the Port Authority
- Renewable fuels of non-biological origin (e-methanol)
- Symbiosis: Use of captured CO2 from local industry
- First phase targets 100.000 tn/year of green methanol.
- Collaboration: storage will be provided by current terminals.

Green Methanol from renewable energy or biomass

Dedicated areas in **Port Planning**: Green energy wharf



Concession request announcement:

https://www.boe.es/diario_boe/txt.php?id=BOE-B-2026-16453



ETOEI-1: Develop the alternative fuels supply chain

Storage, loading and transport infrastructure; clear regulation; attracting demand; and developing human capital are key to the adoption of these fuels and to consolidating the Port as a clean energy hub.

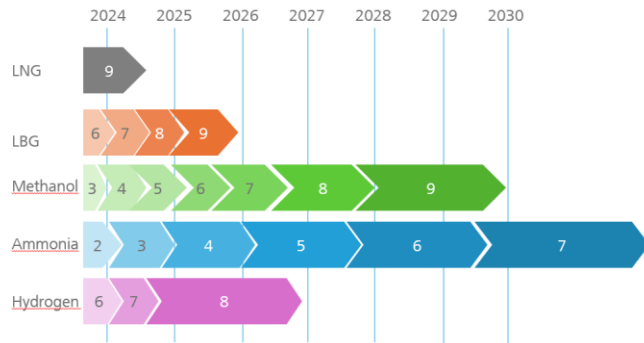
Programmes:

- Alternative fuels (AF) storage
- Regulations for AF bunkering
- AF loading and unloading infrastructure
- AF bunkering in the port

Flagship project:

Construction of 4 New Liquid bulk jetties prepared for Sustainable fuels have been tendered.

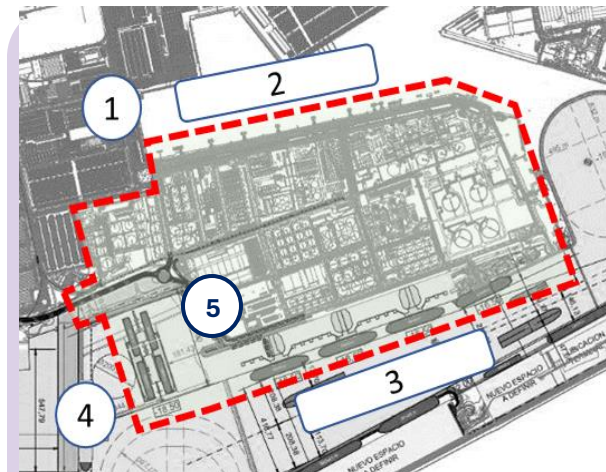
IAPH Port Readiness Level



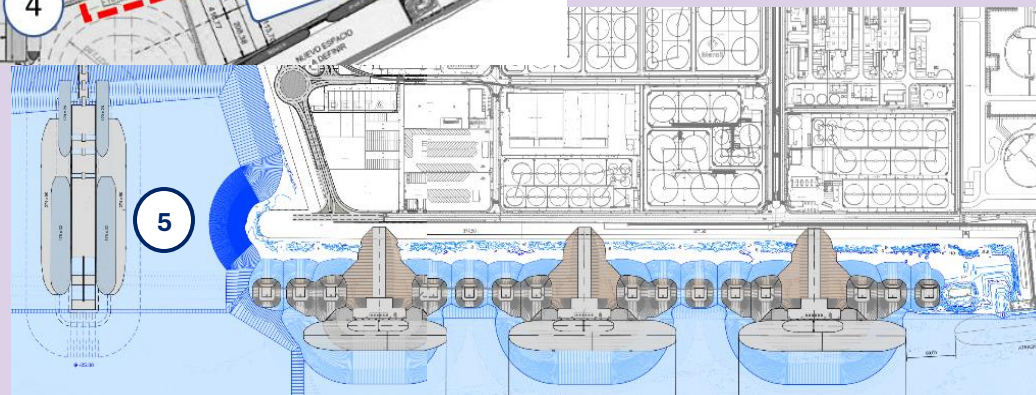
2025 - Simplification of LNG Bunkering authorization

2026 - Methanol bunkering regulation ready

2026 – First biofuel and methanol bunkering barge based at the port -> Bahía Candela



- ① **New berth for barges with AF connection.**
- ② **Remodeling of 32's berths for chemicals and FAME (draught -14m).**
- ③ **New berths 34's (C-D-E) Jetty type (draft -18.5m).**
- ④ **New 35's berths. Pontoon type. (draught -18.5m).**



- ⑤ **Berth for idle barges**

3 & 4 are prepared berths for alternative fuel bunkering barges



ETOEI-1: Develop the alternative fuels supply chain

Storage, loading and transport infrastructure; clear regulation; attracting demand; and developing human capital are key to the adoption of these fuels and to consolidating the Port as a clean energy hub.

Programmes:

- Alternative fuels (AF) storage
- Regulations for AF bunkering
- AF loading and unloading infrastructure
- AF bunkering in the port

Flagship project:

New fuels bunkering



America's Cup Hydrogen pilot

Supply auxiliary boats with hydrogen

[Press Release: AMERICA'S CUP BRINGS HYDROGEN TECHNOLOGY](#)



Bio-diesel Bunkering

A bunker operation has been carried out

[Press Release: Peninsula Adds Chemical Tanker Aalborg to Supply in the Port of Barcelona - Peninsula](#)



Bio-LNG bunkering

LNG terminal is certified by ISCC EU and both STS and TTS have been successfully done

[Press article: https://www.offshore-energy.biz/barcelona-port-hosts-its-first-ship-to-ship-bioLNG-bunkering/](https://www.offshore-energy.biz/barcelona-port-hosts-its-first-ship-to-ship-bioLNG-bunkering/)

ETOEI-2: Support access to innovation funding

In order to remain competitive and be a pioneer as a port, funding will be made available for projects that further the strategic objectives, seeking pilot testing sites and collaborating in European innovation projects.

Programmes:

- Participation in European projects
- Support projects with an impact on the port
- Energy Sandbox
- Marine energy

Flagship project:



An innovation hub specialized in the blue economy that connects startups, companies, technology centers and institutions to develop **impactful solutions**.



Press release: [BlueTechPort | Port de Barcelona](#)



In 2023, the BlueTechPort pilot test was launched at the Tech Barcelona facilities. In July of that same year, 200 square metres were refurbished at Palau de Mar to create a coworking space for 30 people. One year later, following the success of the initiative, the first of the six warehouses in Sant Bertran was inaugurated. At the end of 2025, construction of **The Lighthouse** began, with completion expected by early 2028.



25.000 m²

Scaleups

Institutions

Education

Startups

Corporates



ETOEI-3: Develop the hydrogen economy in the port environment

Promoting the **local demand for hydrogen** through the development of infrastructure for production, reception, compression, transport and storage has a growing interest as the port seeks to position itself as a central European hub in the hydrogen economy.

Programes:

- Strengthen the local ecosystem
- Availability of green hydrogen
- Local green H₂ Production
- Hydrogen logistics

Flagship project:

The SympH2ony Project

- Joining venture: **Toyota Tsusho Europe and Messer**
- Integrated approach: infrastructure and fleets
- Production, Supply and mobility solutions
- Located in a strategic role with logistics flows for the port and hinterland
- 3,2 MW Electrolysis capacity (2030) with 100 % renewable electricity
- Expandable to 6,2 MW (2032)
- Key infrastructure to provide clean hydrogen for vehicles of the port and outside the port.



Press release: [SympH2ony preveu invertir 20 milions d'euros al Port de Barcelona per impulsar un ecosistema europeu d'hidrogen verd | Port de Barcelona](#)



ETOEI-3: Develop the hydrogen economy in the port environment

Promoting the **local demand for hydrogen** through the development of infrastructure for production, reception, compression, transport and storage has a growing interest as the port seeks to position itself as a central European hub in the hydrogen economy.

- Programes:**
- Strengthen the local ecosystem
 - Availability of green hydrogen
 - Local green H2 Production
 - Hydrogen logistics

Flagship project:

- 140 MW compression station
- Distribution of hydrogen to France, Germany and Belgium
- Transport of 10 % of 2030 Europe demand
- On 28 November 2023, the European Commission included the H2med project in the 6th list of Projects of Common Interest (PCI), renewed on 2026.

Link of interest: [H2med - El proyecto H2med](#)

H2MED

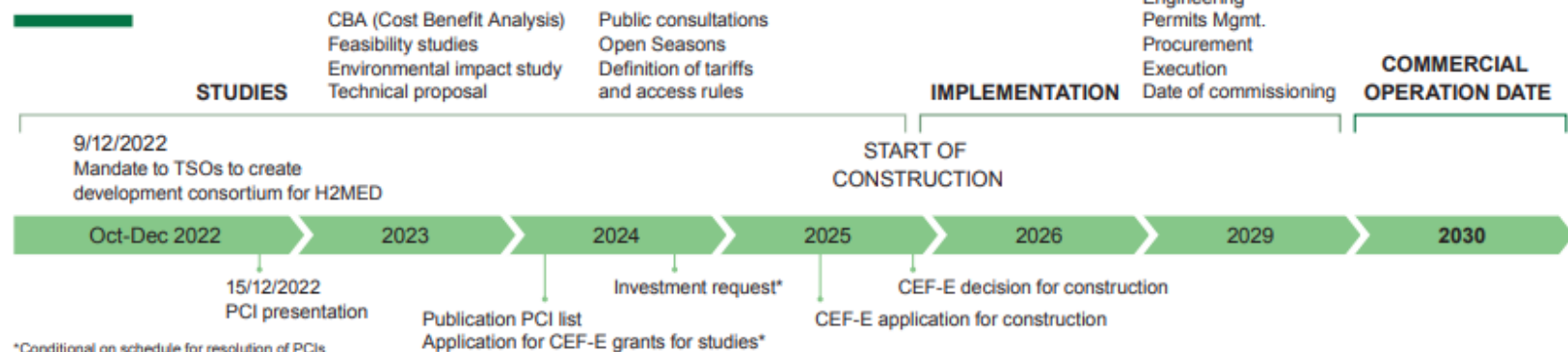
2 BarMar

Maximum capacity	2 Mt
Length	455 km
Diameter	28"
Max. depth	2,600 m
Operating pressure	210 bar
Compression station	Barcelona station 140 MW
Investment	≈ €2,135 M



It will be able to transport **10%** of total European demand by 2030

Schedule



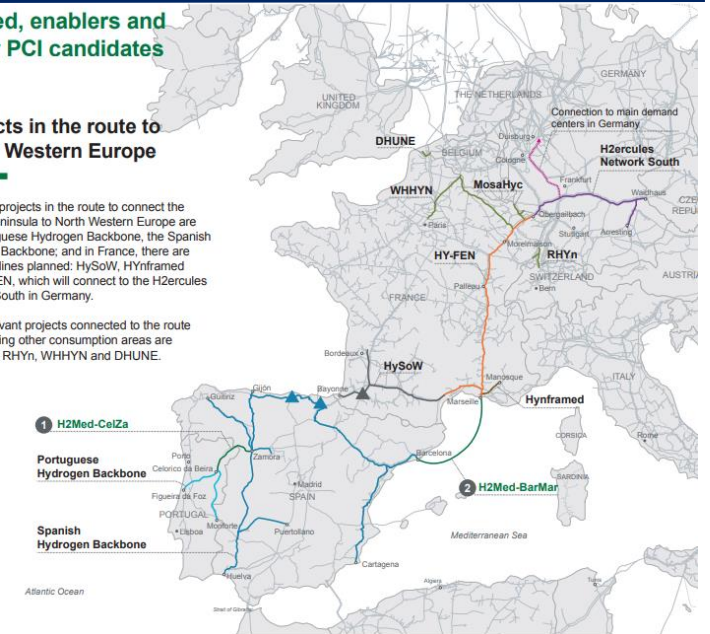
*Conditional on schedule for resolution of PCIs

H2Med, enablers and other PCI candidates

Projects in the route to North Western Europe

The main projects in the route to connect the Iberian Peninsula to North Western Europe are the Portuguese Hydrogen Backbone, the Spanish Hydrogen Backbone, and in France, there are three pipelines planned: HySoW, HYNframed and Hy-FEN, which will connect to the H2ercules Network South in Germany.

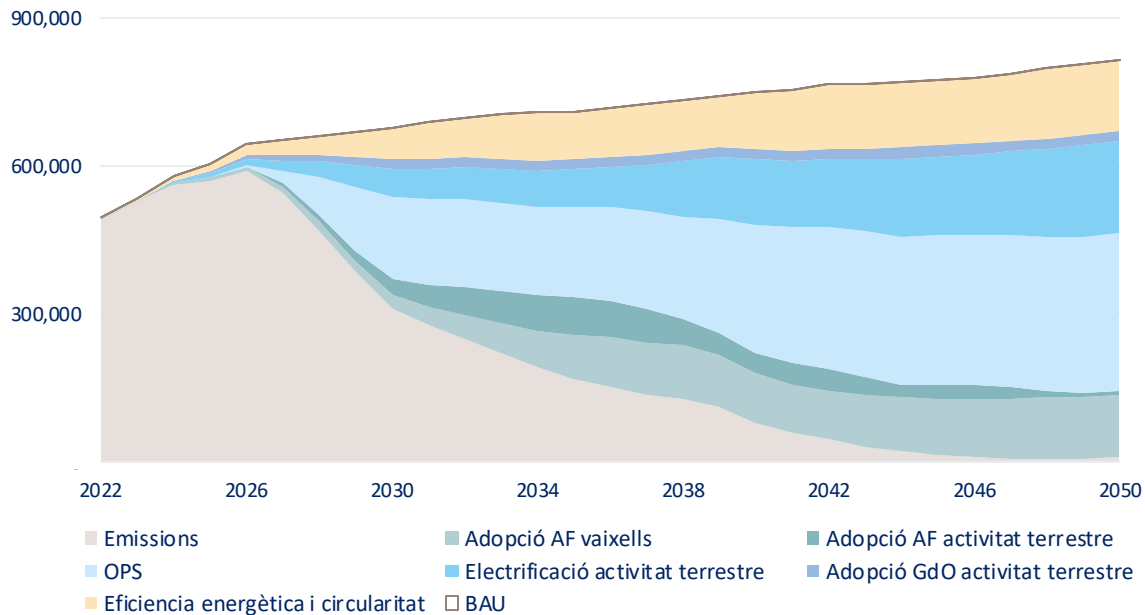
Other relevant projects connected to the route and reaching other consumption areas are MosaHyc, RHYn, WHHYN and DHUNE.



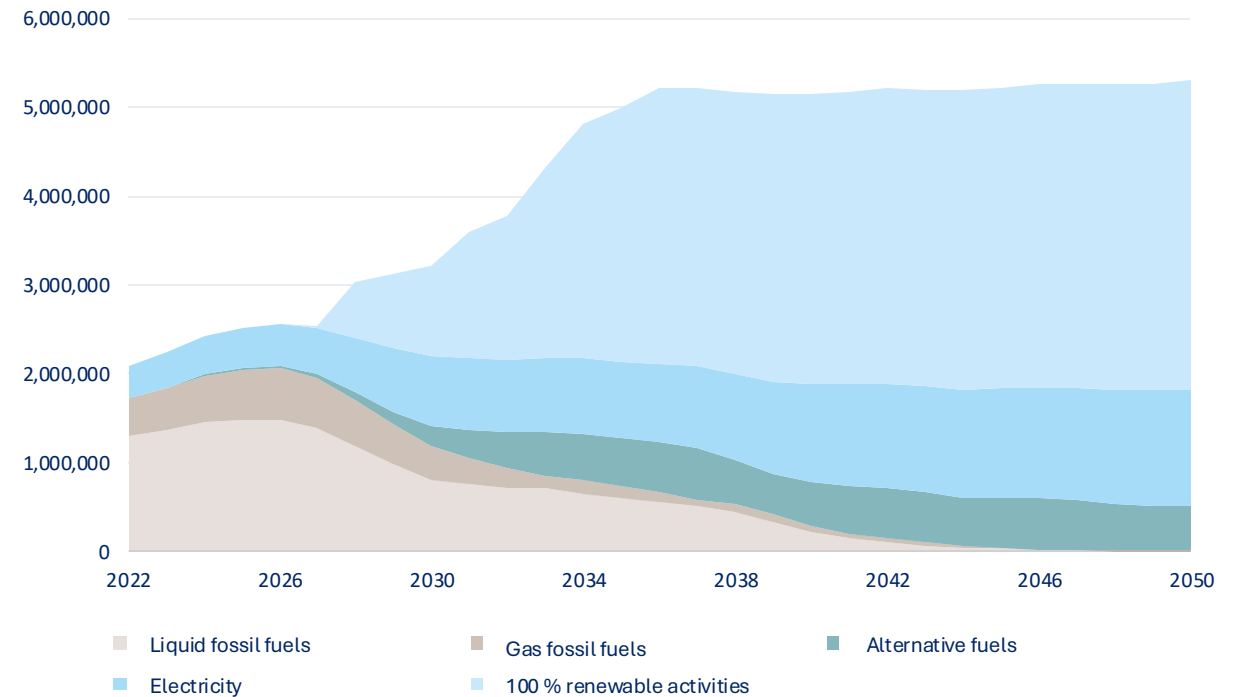
Based on traffic predictions and current trends, the Port has calculated reference scenario, or business as usual (BAU), characterised by a relatively stable emissions trajectory with a steady increase over time due to expected growth.

The roadmap sets out actions to mitigate emissions. Until 2030, this entails electrifying wharves, adopting renewable guarantees, improving energy efficiency and adopting alternative fuels; from 2030 to 2040, adopting sustainable fuels; and from 2040 to 2050, electrifying mobile equipment, transport and industry

Strategic evolution of the mitigation of GEI



Evolution of the sources of final energy consumed



Energy transition monitoring

A comprehensive and diverse plan such as the one proposed requires rigorous monitoring to continuously evaluate its correct implementation and the achievement of the objectives set.

Indicators for each LD will be published annually to ensure transparency and to quantify progress, identifying areas for improvement.



Every five years, a review of the Plan will be carried out to ensure its effectiveness over time and adjust the strategy.



Establish an observatory to monitor new solutions, regulations and/or events in order to carry out the proposed revisions and eventually inform of the need of an extraordinary review.



ASSIGNMENT OF KEY PERFORMANCE INDICATORS TO EACH OBJECTIVE

DECARBONISATION (annual t CO ₂ of the port)	
ETODC-1	% of electricity with GO
ETODC-2	CO ₂ -eq intensity of the fuel consumed
ETODC-3	% of connected ships

SUSTAINABILITY (GWh consumed in the port/year)	
ETOSU-1	% of energy consumption from electricity sources
ETOSU-2	average energy/t-mi
ETOSU-3	MWh reused

RESILIENCE (MWp of installed renewable electrical power)	
ETORE-1	MWh renewable generated
ETORE-2	% of energy consumed from local sources and/or PPAs
ETORE-3	MWh of AF produced linked to the port

INNOVATION (% AF of energy traffic)	
ETOEI-1	MWh of AF supplied to ships
ETOEI-2	€ innovation funding
ETOEI-3	H ₂ port readiness level

