Consiglio Nazionale delle Ricerche
STEMS
Istituto di Scienze e Tecnologie per l'Energia e la Mobilità Sostenibili



MOBILITY & LOGISTICS PANEL

Travelling green, staying competitive

EU transport policies and their impact on the Italian transport system

Connact Mobility & Logistics

What is sustainable mobility?

- Not just moving people and goods: **connecting lives**
- The Sustainable Development Goals (SDGs) Drive
- Four pillars: fair, healthy, green, resilient
- Focusing on people, safety, and access for all



The six pillars of sustainable transport



1. **Sustainability**
2. **Accessibility and universality**
3. **Fairness**
4. **Human Rights**
5. **People-centred planning**
6. **Safety**

The city that moves best

- Lower demand for transport and less reliance on cars
- Less fossil fuels, less environmental impact
- More public transport, cycling, and walking



Sustainable transport outside urban areas

A combination of new technologies, smart logistics and alternative fuels



Battery electric vehicles (BEVs)

ideal for **short-haul journeys**, urban deliveries, and last-mile logistics

Green hydrogen

the best choice for long-haul **heavy goods transport**

Smarter logistics and modal shift

Intermodal transport can reduce emissions by **30** to **60%**

Route optimisation

the use of **artificial intelligence** and smart logistics helps to reduce downtime, avoid empty return journeys, and lower overall fuel consumption

Longer and heavier vehicles (LHV)

high-capacity, optimised freight transport configurations enable more goods to be transported per journey, thereby reducing the overall environmental impact

Main obstacles



Main obstacles
a significant shortage of high-power charging points and hydrogen refuelling stations

High initial costs
low-emission heavy-duty vehicles and alternative fuel systems involve a much higher initial investment

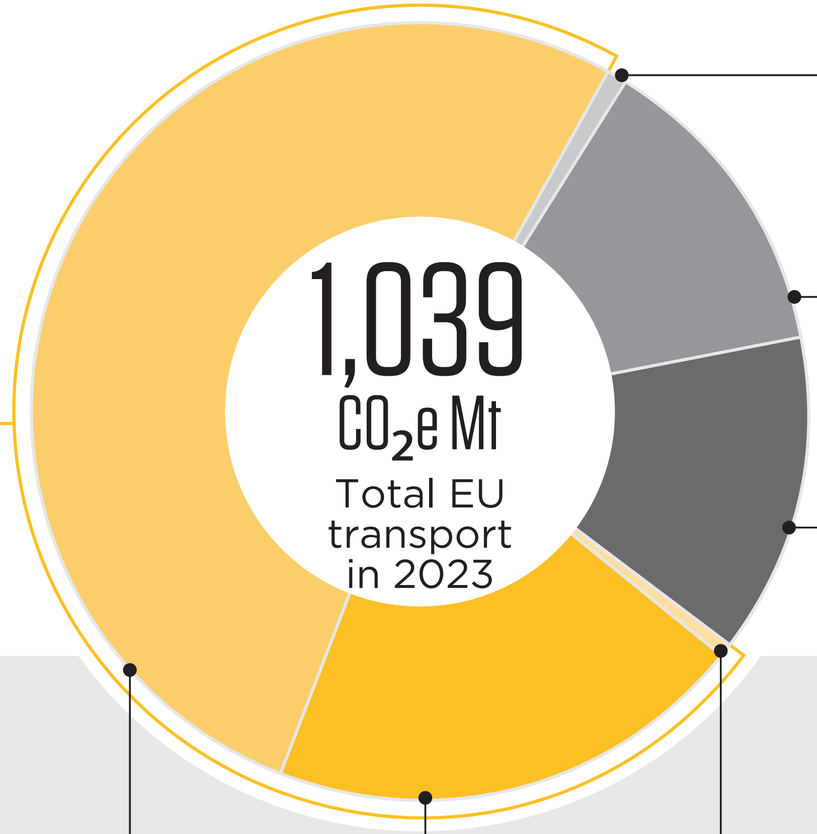
Limitations of the electricity grid
electricity grids often lack the local capacity required for the rapid charging of fleets of heavy-duty electric lorries at distribution centres

Which mode of transport causes the most pollution?

31%

of the EU's greenhouse gas emissions is linked to **transport**





72.9% Road transport

0.6% Railway and others

13.1% Aviation

13.4% Navigation

52.4% Cars and vans

20% Heavy vehicles

0.5% Motorbikes and mopeds

Lorries: the toughest challenge

- Electric for short journeys, green hydrogen for long ones
- From lorry to train and ship: emissions reduced by **30-60%**
- Obstacles: few charging points and hydrogen stations high costs, weak electricity grids

Source: EEA, Sustainability of Europe's mobility systems 2025 · EU-27, 2023, including international bunkers

What FuelEU Maritime requires of ships

- To reduce the greenhouse gas emissions associated with the energy used on board
- To connect to the shore power supply to meet their electricity requirements while moored at the quay, unless they use another zero-emission technologyThis

This applies to ship of over

5,000 t

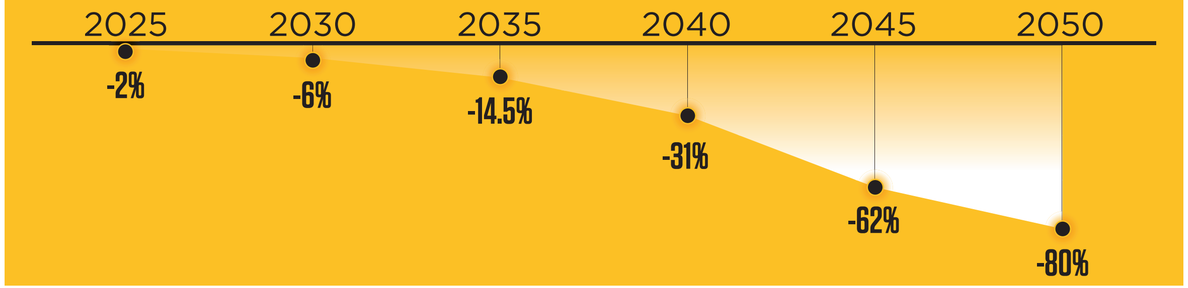
of tonnage calling at EU ports



That is **55%** of ships



90% of the sector's CO_2

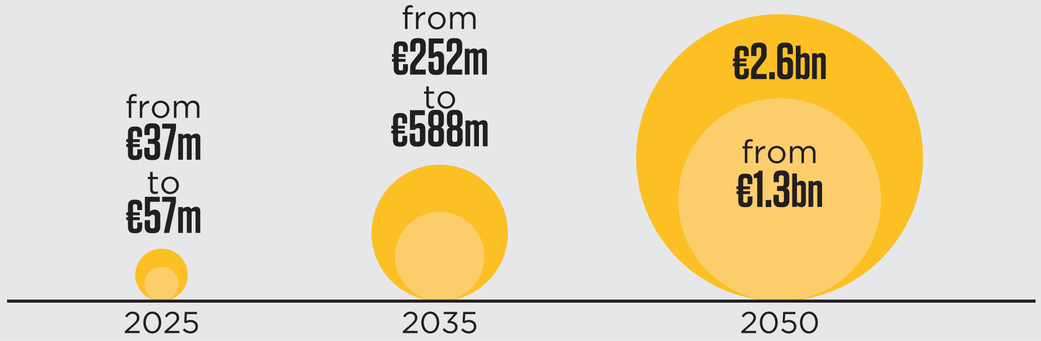


Greenhouse gas intensity
Average annual reduction compared with the 2020 average

How much does FuelEU cost the Italian

ADDITIONAL COST OF B20 BIOFUEL





A ship doesn't just pollute the air

- Since 2024, ships are included in the ETS market
- Since 2025, FuelEU Maritime: greenhouse gas emissions from fuels -2%, up to -80% by 2050
- Decarbonised, digital, and automated ports
- Gradual phase-out of heavy fuel oils

MANCA TRADUZIONE

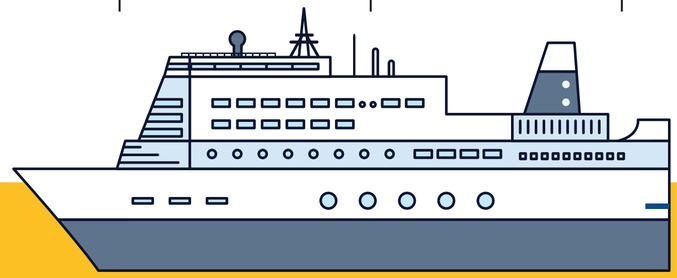
Emissioni in atmosfera:
gas serra e inquinanti

Greenhouse gases

CO_2, methane (CH_4), nitrous oxide (N_2O), fluorinated gases (HFCs, PFCs, SF_6)

Pollutants

nitrogen oxides (NOx), sulphur oxides (SOx), non-methane volatile organic compounds (NMVOCs), carbon monoxide (CO), particulate matter (PM, including black carbon)



Discharges into water:
outlets, antifouling paints, invasive species

Oils and oily

Ballast water

Waste and solid

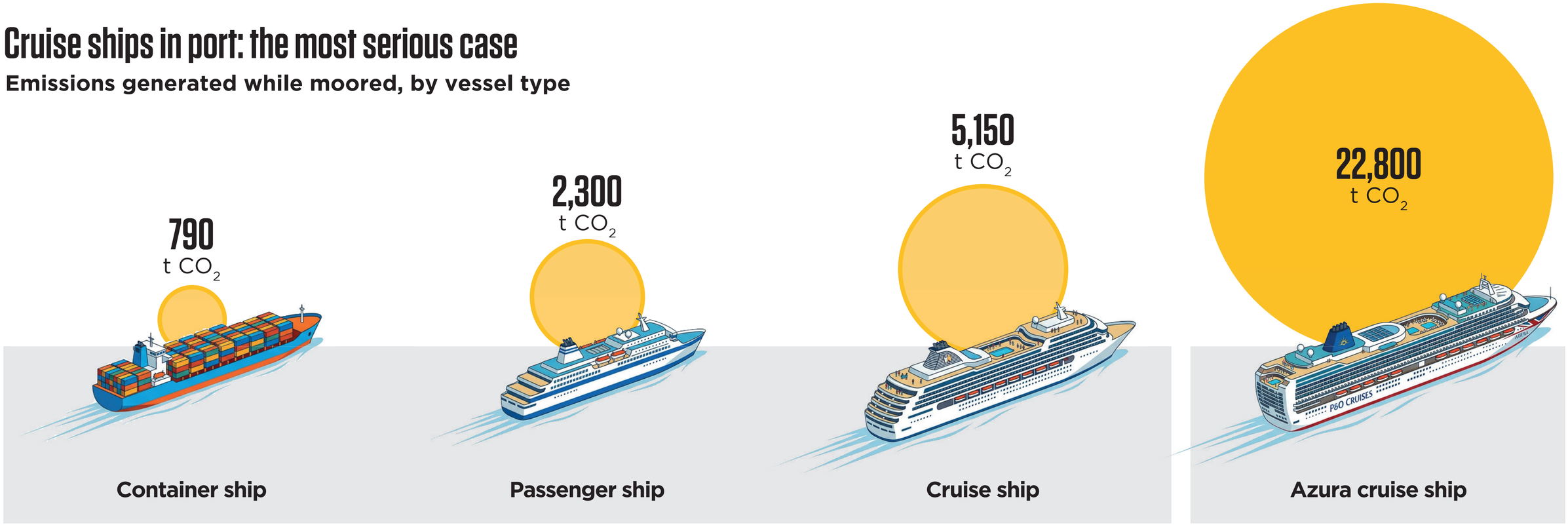
Wastewater

Antifouling paints

Source: EMSA/EEA (2021) · Regulations: Reg. UE 2023/1805 (FuelEU Maritime), Dir. UE 2023/959 (ETS)

Cruise ships in port: the most serious case

Emissions generated while moored, by vessel type



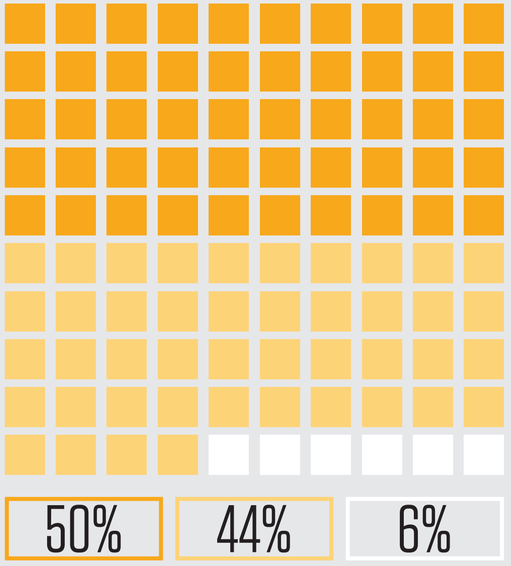
- When moored, a cruise ship emits more than **6 times** the emissions of a container ship
- Average per cruise ship: **5,150 t of CO_2** per year, compared with 790 tonnes
- The Azura (Carnival) alone: **22,800 t** in EU ports in 2023
- Only **20%** of the EU-required electrical sockets on the quayside have been installed

Source: T&E on MRV 2023 data; DNV research for T&E (July 2025)

Ammonia or hydrogen for ships

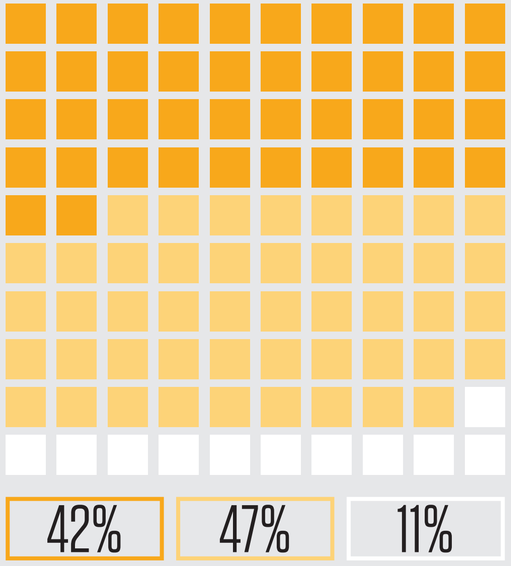
Ammonia Hydrogen Other

Internal combustion engines



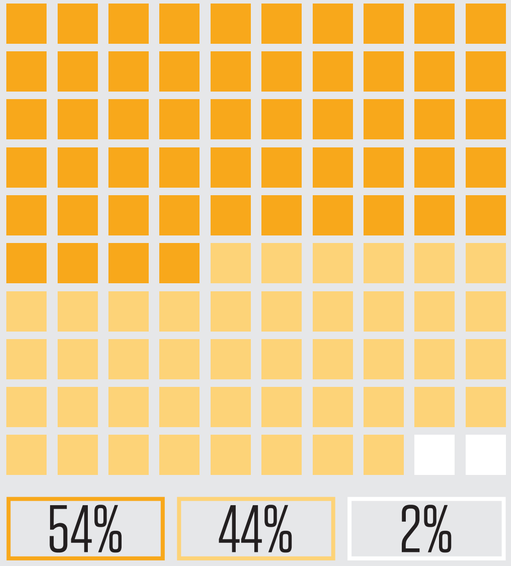
62 PROJECT

Fuel cells



57 PROJECT

Mixed-use projects*



59 PROJECT



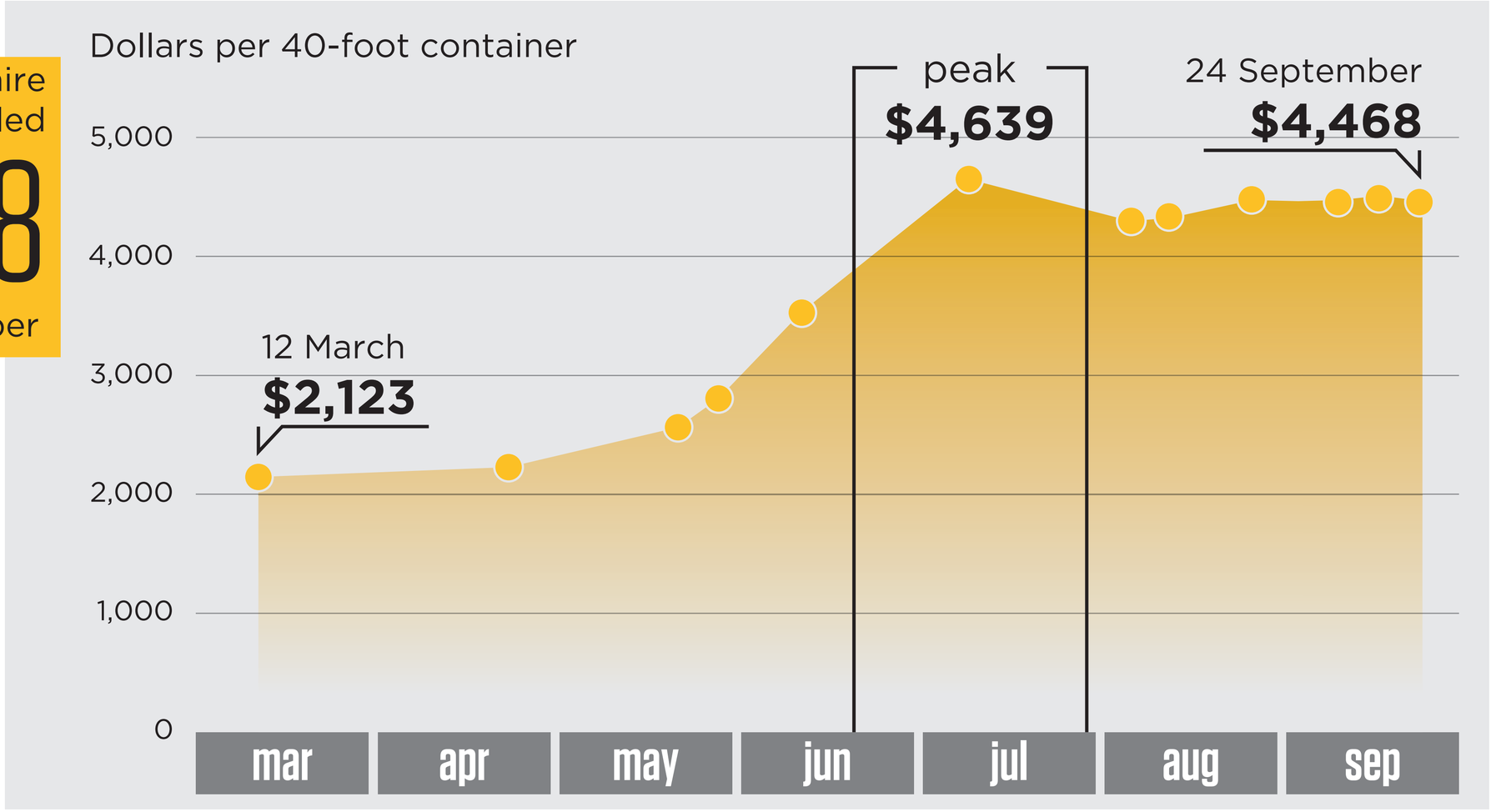
*Projects that could develop both technologies

The crisis is taking its toll on container freight rates

Container hire more than doubled

$4,468

at the end of September



Causes:

Tensions in the Strait of Hormuz; the partial resumption of traffic through the Suez Canal causes freight rates between Asia and Europe to fall

Source: Drewry World Container Index, weekly figures available from 12 March to 24 September 2026

The SAF is the most effective tool

up to 65%
of CO_2 emissions cuts by 2050

New engines
(hybrids, hydrogen, electric):
5-21%

CO_2 removal
10-19%

ReFuelEU
SAF at 2% in 2025,
at 70% in 2050



Source: Destination 2050, IATA, ICAO (scenarios S2 e S3) · ReFuelEU Aviation, Reg. UE 2023/2405

Four priorities for airports



SAF & innovative aircraft

Promote **the production and adoption of SAF**, ensuring financial support throughout the entire value chain, and supporting **R&D on e-fuels**.
Support **R&D** for **next-generation aircraft**.



Energy

Support investment in **energy storage systems** at airports, integrate **renewable energy installations for self-consumption**, encourage the production of **biomethane** and strengthen the **hydrogen** supply chain.



Green Airport

Support **energy efficiency** at airports, encourage the decarbonisation of fleets, improve **air traffic management**, establish a **framework for CO_2 emissions offsetting**, and promote the **circular economy and biodiversity**.



Accessibility & Smart City

Accelerate **intermodal projects** at airports, promote **intermodal partnerships** with integrated ticketing, support the expansion of **Urban** and **Advanced Air Mobility**, and support **sustainable mobility** solutions.

The strategy for military mobility

Transport and connect
Includes measures to strengthen the competitiveness, sustainability, and connectivity of maritime transport

Simplification
Measures are planned to simplify reporting procedures and administrative obligations for the maritime sector, support the green and digital transition, promote high-quality maritime transport, and strengthen international relations

Safety and security
It aims to strengthen European capabilities in the naval, submarine, military and dual-use mobility sectors, with a view to enhancing security and resilience

The allocation of European Union funding for military mobility under the CEF programme

