

Sustainable Freight Transportation

1. Short Description

Innovative digital and deep-tech solutions to enable the necessary transition to sustainable freight transportation. This includes hydrogen and battery-electric trucks, trains, ships and planes, hydrogen transport, storage & fuelling solutions, heavy-duty charging infrastructures, green ports & airports, port energy supply and port vehicles, smart multi-modal optimisation to reduce GHG emissions and autonomous & guided vehicles.

2. The Problem

At a global level, freight transportation makes up 8-10% of GHG emissions, and even 11% if ports and warehouses are included. 65% thereof is produced by trucks and vans, with 2.2 billion tonnes of CO₂ (in 2020). Global sea freight accounts for about 700 million tonnes (and 3-4% of EU CO₂ emissions), rail for 170 million, and airfreight is estimated to be emitting about 160 million.

The transport sector remains one of the only sectors of the EU economy where emissions are still above 1990 levels. Within this sector, road transport is by far the biggest emitter accounting for more than 70% of all GHG emissions from transport in 2019. To achieve climate neutrality, Europe needs to reduce transport emissions by 90% by 2050. Regulatory requirements, CO₂ and fuel prices increasingly force the industry to take action. Considering the long economic lifetime of ship, vehicle, and infrastructure assets, it is essential to plan transformation early, to avoid being stuck with “stranded assets”.

Heavy-duty (mostly long-haul) vehicles and ships (especially when in ports) also contribute significantly to air pollution, including NO_x and small particles, therefore creating health risks for European citizens.

On the other hand, freight transport is crucial for our society, as it provides us access to food, shelter, energy, and all products we need, and it also enables our industries to flourish. Our freight transport industry therefore must speed up its sustainability transformation, in order to continue to provide its critical services at reasonable costs, but with substantially less environmental impact and dependence on import of fuel from outside Europe. This requires concerted actions by all ecosystem players, including vehicle manufacturers, fuel/energy providers and infrastructure operators, ports and airports, transport companies, and their customers.

Key barriers to overcome for the sustainability transformation of freight transportation include:

- Vehicle and vessel availability and suitability (incl. range, payload, charging time)
- Infrastructure availability (fuelling, charging, incl. electricity grid)¹
- Fuel availability and affordability (esp. green hydrogen)
- Total cost of ownership (TCO), capital costs and suitable business models
- Regulatory uncertainty

¹ One 29 February 2024, the European Commission announce to make €1bn available for recharging and refuelling points under the Connecting Europe Facility (CEF)

3. Sustainability and Sovereignty Impact Potential for Europe

Developing and deploying more sustainable freight transport solutions is essential for Europe to:

- Reduce GHG emissions from transport of goods within, to and from Europe, to realise our decarbonisation targets
- Reduce the health risks for European citizens from air pollution caused by trucks and ports (especially moored ships)
- Reduce the dependency on imported fuels for our freight transport
- Assure a strong European transport sector, providing essential, efficient, and affordable services to our European society.

4. Deep tech and Digital and Innovation Potential

A broad range of Deep tech and Digital innovations will be considered to address the challenges mentioned above. These include, but are not restricted to:

- Zero-emission truck, train, ship, and plane solutions (Battery-Electric and Fuel Cell)
- Alternative fuel truck, train, ship, and plane solutions (bio- and e-fuels)
- Heavy-duty charging infrastructures, including grid solutions
- Fuelling infrastructures, including transport and storage solutions, esp. for hydrogen
- Integrated routing and charging/fuelling planning tools for trucks, ships and planes (incl. AI)
- Vehicle and ship efficiency technologies
- Green ports and airports, including energy supply and zero-emission port vehicles
- Autonomous & guided vehicles for ports, airports, and warehouses
- Smart multi-modal transport tools and solutions (train/ship/truck), incl. AI
- Transport sustainability measurement, management and reporting tools, incl. AI

Key success factors to be addressed by innovative solutions include:

- Scalability of the solution
- Suitability for (upcoming) regulations
- Acceptance by all industry stakeholders
- Manageable “green premium” costs versus less sustainable solutions (taking into account future CO2 pricing and regulatory requirements)

5. European Market Potential

The European transport and logistics sector contributes to about 5% of total Gross Value Added in 2021, with 636 B EU and employing 10 million people or 5% of the total workforce.

Analysts vary widely in their estimations (and definitions) of the total European Freight and Logistics market, ranging from 30 B USD to 1 trillion USD, and with growth forecasts ranging from 4% to 11% CAGR. The European Road freight market was estimated at 325 B EU in 2022.

Many major transport companies are headquartered in Europe, covering road, rail and water transport. Several truck and train manufactures are also based in Europe. A key role in driving the

sustainability transition, however, is played by the main customers of transportation: the big OEMs in fields like fast-moving goods, food, industry, construction.

According to UNCTAD review of Maritime Transport 2023, up to \$28 billion would be required annually to decarbonize only ships by 2050, in addition to up to \$90 billion to build the infrastructure to store, deliver and transfer zero-carbon fuels. For DHL alone, the company has a target of spending up to 7 billion euros on decarbonization by 2030.