European Commission

GREEN DEAL PROJECTS SUCCESS STORIES

URBAN ENVIRONMENT & MOBILITY WORKING GROUP

INNOVATIVE TECHNOLOGIES FOR GREENER PORTS

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MAGPIE
SMART GREEN PORTS
project

MAGPIE focuses on supporting the energy transition across Europe's ports. It is innovating and demonstrating how ports can be readied for the next generation of fossil-free fuel alternatives.

MAGPIE has demonstrated how the Port of Rotterdam can supply ships with ammonia fuel and implement electric-powered automated dockside freight vehicles.

#EUGreenDeal

ABOUT THE MAGPIE PROJECT

In the years ahead, the transport sector is expected to transition to clean power, and ports and their stakeholders are expected to play a key role in that transition. MAGPIE's aim is to support that shift and foster a breakthrough in the supply and use of green energy carriers from and within ports.

The project centres on demonstrating technological and digital innovations related to the decarbonisation of maritime, inland, and land transport in and around ports, as well as providing non-technological solutions to facilitate the implementation and uptake of the innovations. The project involves more than 40 public and private partners spread across Europe.

DESCRIPTION OF SUCCESS

MAGPIE has demonstrated the viability of two demonstrators, furthering the advancements of greener ports in Europe.

The first demonstrator focused on ammonia bunkering - supplying ships with ammonia fuel - for maritime transport. Ammonia is a CO_2-free fuel and is considered one of the leading potential fuels to decarbonise international shipping. In April 2025, MAGPIE successfully conducted an ammonia bunkering trial between two ships in the Port of Rotterdam. 800 cubic metres of cold (–33°C) liquid ammonia was transferred between the two vessels and took about 2.5 hours. This

success marked an important step in preparing the port of Rotterdam for vessels to bunk clean ammonia.

The second MAGPIE demonstrator focused on combining electric power and automated control of freight trucking in ports. MAGPIE hosted its Automated & Electric Trucking event in Rotterdam in April 2025 and welcomed stakeholders, partners, and national and local government representatives to showcase its automated electric driving and automated charging technologies. These technologies have shown improved efficiency and reduced energy consumption. A live demonstration was given of an automated heavy-duty electric truck, coupled with a hands-free charging system. The success heralds new applications of automated trucks in industrial zones and on public roads in the near future.

HIGHLIGHTS

- Successfully demonstrated an ammonia bunkering trial at the Port of Rotterdam.
- Validated the safety framework for ammonia bunkering, no ammonia release occurred.
- Demonstrated the integration of automated and electric driving for freight trucking.
- Showcased automated heavy-duty electric truck charging and operating.

IMPACT

Rotterdam is the world's second-largest bunker port (a port with specialised ship fuelling facilities), with approximately ten million tons of fuel bunkered annually. To prepare the port to bunker ships that run on new, sustainable fuels, all regulatory, safety, infrastructural, and supply factors need to be in order. MAGPIE has enhanced the port of Rotterdam's readiness for the bunkering of the first ammonia-fuelled ships.

Regarding trucking, combining electric motors with automated driving and charging reduces manual labour during charging. It enables more precise, data-driven logistics planning and addresses the core elements of the energy transition: sustainability, cost efficiency, and reliability.

The learnings from both demonstrations will be disseminated to the fellow ports of the MAGPIE project for uptake, to the EU Commission, and other relevant parties.

Read more about this success story online
Innovative fuelling technologies for greener ports

Visit the project website
MAGPIE

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