PIONEERS

Portable Innovation Open Network for Efficiency and Emissions Reduction Solutions

Green Straddle Carriers

PSA ANTWERP

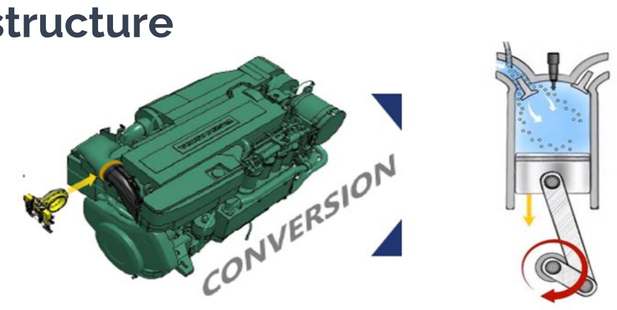
INTRODUCTION

Container terminals in Antwerp generate significant scope-1 emissions as a result of the horizontal transportation of containers using straddle carriers. The objective of the Green straddle carrier demonstration is **to test and validate the use of hydrogen dual-fuel technology in day-to-day terminal operations.**

METHODOLOGY

The dual fuel technology as transition paradigm takes into account the following steps:

- **Injection of hydrogen into the diesel engine 30% to 80%**
- **Robust and reliable: full diesel as backup**
- **Allows to gradually build up the H2 infrastructure**



The demonstrator has been created through a collaborative design process involving key stakeholders, with the aim of making the innovation transferable to other ports after the project completion.

HYDROGEN SUBSYSTEM

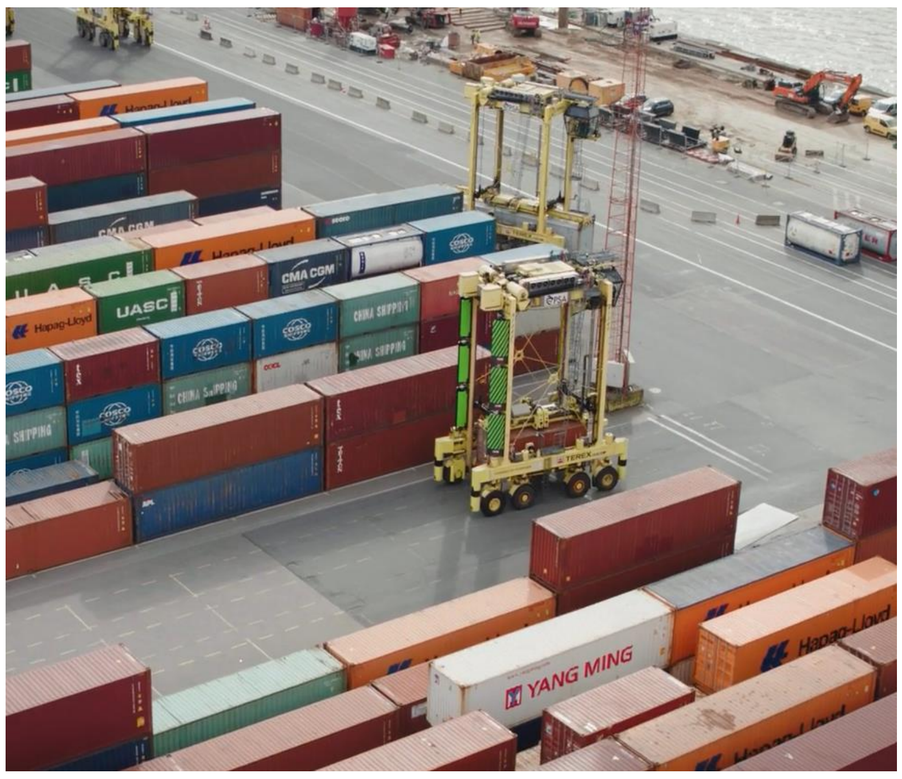
- Retrofit of the engine
- Hydrogen piping and safety valves
- Controller for H2 injection
- 6 hydrogen cylinders containing 5kg H2 each with a three-stage crash protection system
- Refueling directly from tube trailer

RESULTS & IMPACTS

- To learn if hydrogen can be used on terminals (safety, regulations)
- To investigate the optimal location of hydrogen tanks on the straddle carrier
- To understand the efficiency of the hydrogen injection: how much kg H2 is needed to replace 1liter diesel
- To evaluate the maximum amount of hydrogen that can be stored on the straddle carrier

FIRST OUTCOME

The system fully operational and the average diesel reduction is of >35%



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Find out more here