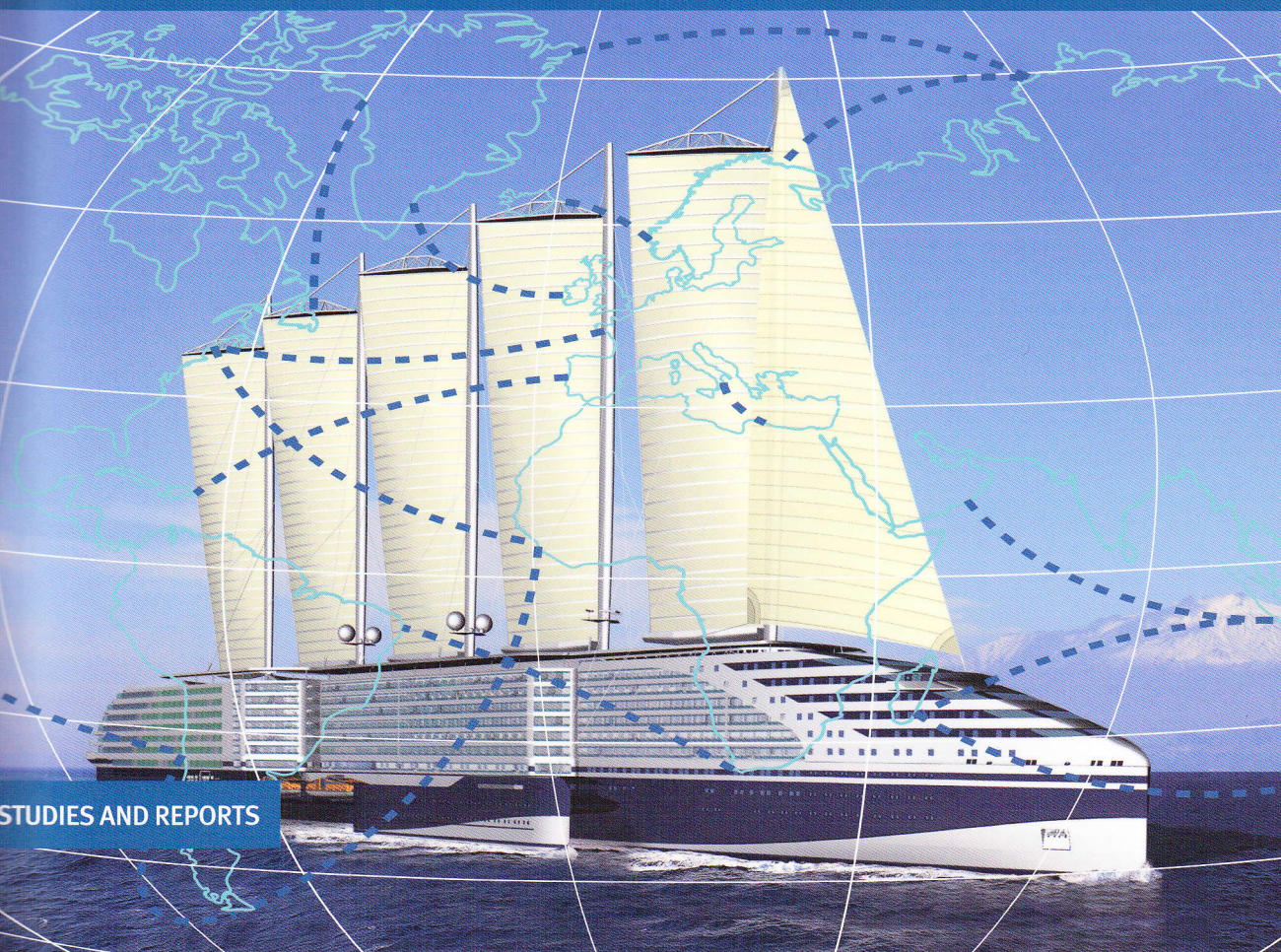


# Staying ahead of the wave

Towards greener, safer, and more competitive waterborne transportation



STUDIES AND REPORTS

## Cleaner engines

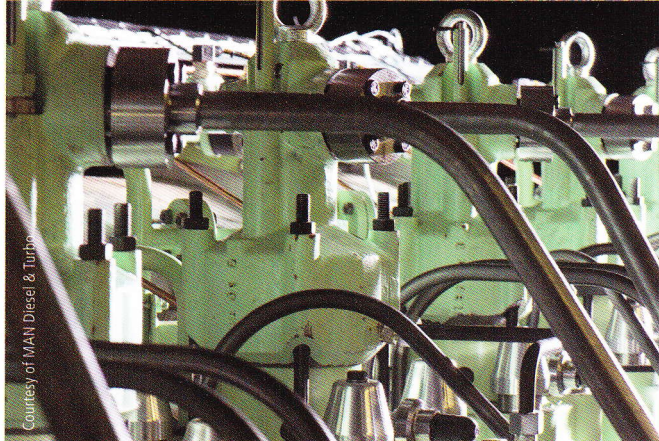
Through the EU-funded HERCULES and HERCULES B projects, engine manufacturers MAN Diesel and Wärtsilä have joined forces to spearhead efforts to make ship engines cleaner and more energy efficient. Between them, the two companies cover about 90 % of the world market for ship engines, and as 99 % of the world's ships have diesel engines, the project outcomes will be of relevance to vessel owners worldwide.

The HERCULES team, which counts more than 30 partners, has set itself the ambitious goal of cutting fuel consumption (and by extension CO<sub>2</sub> emissions) by 10 %, NO<sub>x</sub> emissions by 70 % and other emissions (such as particulate matter) by 50 %, all by 2020.

In its first phase, HERCULES investigated a range of technologies designed to meet these goals; the most successful ones are being developed further under the second phase of the project, dubbed HERCULES B. Among other things, the initiative has resulted in an exhaust gas recirculation system that includes a gas cleaner and could cut NO<sub>x</sub> emissions by up to 85 %. A prototype of this system has now been installed on a small container vessel. The project has also come up with after-treatment units that can be retrofitted to existing engines to tackle NO<sub>x</sub> emissions.

Computer simulation tools that model the combustion process are another useful project outcome; these shed new light on ways to reduce emissions under different operating conditions. Elsewhere, the project is working to boost efficiency by bringing together the right combination of components. While a lot of effort goes into optimising the design of turbines, boilers and engines, this research has revealed that selecting the optimal combination of components can improve overall efficiency by up to 5 %.

Friction has a major influence on engine efficiency, and HERCULES has developed a new, non-metallic-bearing material and system that effectively cut losses due to friction.



### HERCULES – Cleaner diesel engines on ships

High-efficiency engine R&D on combustion with ultra-low emissions for ships

The overall aim of the HERCULES project was to improve the efficiency of diesel engines on ships by 10 %. The project united the expertise of the world's two leading ship-engine manufacturers who have set up a unique management structure for the project that allows them to cooperate on research while still competing with one another on the business front. HERCULES identified a number of promising technologies that will help the shipping industry meet its environmental targets.

The second phase of the project – Hercules B – is making major strides in the development of technologies designed to clean up diesel engines used on ships. Ultimately, HERCULES B aims to cut carbon emissions from shipping by 10 % and slash NO<sub>x</sub> and other emissions (such as particulate matter) by 70 % and 50 % respectively.

#### Coordinator | ULEME EEIG (Germany)

Total budget (Phase I and II) | Phase I: EUR 58.3 million

EU funding (Phase I and II) | EUR 30 million

Start/end (Phase I and II) | 01/03/2004 – 31/08/2011

Website | <http://www.ip-hercules.com/>