

effect of adding to the emissions of carbon dioxide (CO₂), the major 'greenhouse' gas contributing to global warming.

Reliable sources estimate that shipping activity contributes about 5% of total oil-based CO₂ releases into the atmosphere each year, and it is widely felt that emissions from shipping will be addressed on an international scale in the future.

Technical marine engineering collaboration on an unprecedented scale was initiated this year by way of the Hercules integrated project, an EU-backed undertaking which is addressing future environmentally-compatible, marine engine design.

Hercules' 40 partners are tasked with developing new technologies to drastically

late emissions and raise engine efficiency, power density and engine reliability.

In addition to its ambitious, quantified goals as regards further cuts in NOx and other pollutants, the project has also set objectives as regards reductions in fuel consumption and carbon dioxide emissions, relative to 'best available technology in service'. Market leaders such as MAN B&W Diesel and Wärtsilä have steering roles in the programme.

Developing technologies

Current work under way at MAN B&W to achieve lower emissions from two-stroke plant includes the development of a humidity-based system, known as scavenging air moisturizing (SAM), and a

recirculation (EGR) method.

MAN B&W has long experience of utilising water emulsified fuel as an effective, and straightforward means of curbing NOx emissions, in application to low-speed diesels used in stationary power plant. The nascent SAM arrangements, whereby high humidity is induced in the scavenging air through evaporation of water in the hot turbocharger compressor outlet, also promises efficient NOx reduction performance.

A prototype SAM system has confirmed its operational capability on the 4T50ME-X test engine at the company's Copenhagen research centre.

The first seagoing application is scheduled to be put through its paces later this year, on an as yet unidentified

special SAM systems for both the retrofit and newbuild markets are expected to be released before any further tightening in IMO NOx limits.

Investigations with the 4T50ME-X research and demonstrator engine show that the NOx content falls as humidity rises. The system operates with seawater as the consumption medium, and fresh water as the cleaning medium.

After careful evaluation of the various EGR possibilities with two-stroke diesels, the company elected to pursue a solution based on recirculation from the exhaust receiver, to a point in the scavenge air system after the turbocharger compressor.

The two-stroke version of the high-pressure EGR

renewed focus on emissions technology

SW&S correspondent **David Tinsley** examines the ongoing developments in the pursuit for ever more enviro-friendly engines