

Exhausting our green shipping options

June 27 2016



Shipping is currently responsible for approximately 3 million tons of sulphur dioxide emissions, 4.5 million tons of nitrogen dioxide emissions and 900 million tons of greenhouse gas emissions yearly. Credit: Agency for Science, Technology and Research

In 2013, the International Maritime Organization (IMO) introduced new regulations to reduce exhaust emissions attributed to the shipping industry. Shipping is responsible for around 90% of global trade and the effect of reducing emissions such as sulphur oxides (SO_x), nitrous oxides (NO_x), particulate matter and greenhouse gases such as carbon dioxide (CO₂) will have a huge impact on global totals.

Researchers from the Agency for Science, Technology and Research Institute of High Performance Computing (IHPC) together with Sembcorp Marine Ltd and Ecospec Technology Pte Ltd have risen to the challenge of finding ways to meet the IMO's new emissions targets.

The team from Sembcorp Marine Ltd and Ecospec Technology Pte Ltd has developed an exhaust gas treatment system, called cSO_x, which removes SO_x and CO₂ from ships' diesel engine and boiler exhaust emissions. It uses ultra-low-frequency electromagnetic waves to treat seawater, thereby optimising the system's ability to absorb sulphur dioxide and CO₂.

Leveraging on the high performance computing capability of IHPC and its computational fluid dynamics (CFD) expertise, the team gained a better understanding of the flow of exhaust gases within the system and optimised the design without expensive and time-consuming physical experiments. Verification of the CFD analysis was carried out with site measurements, and this, in turn, enabled design improvements to be developed for better performance.

In early 2015, a memorandum of understanding was signed by IHPC, Sembcorp Marine Ltd and the University of Glasgow to collaborate to make ships more eco-friendly. Plans include designing vessels with improved hydrodynamics for better fuel efficiency and further enhancing the exhaust gas cleaning and ballast water treatment systems developed by Sembcorp Marine Ltd and Ecospec Technology Pte Ltd. Shipping is currently responsible for approximately 3 million tons of sulphur dioxide emissions, 4.5 million tons of nitrogen dioxide emissions and 900 million tons of greenhouse gas emissions yearly. Technology such as the cSO_x exhaust gas cleaning system may soon begin to reduce shipping [emissions](#) and give us hope for a more sustainable future.

Moving forward, the team plans to utilize the IHPC computational fluid dynamics model to evaluate the scaled-up cSO_x [exhaust gas](#) cleaning system's geometric parameters for better performance.

Provided by Agency for Science, Technology and Research (A*STAR), Singapore

Citation: Exhausting our green shipping options (2016, June 27) retrieved 23 April 2024 from <https://phys.org/news/2016-06-exhausting-green-shipping-options.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.