Open letter to marine engine manufacturers for transparency in CH_4 emissions data

The shipping sector must accelerate its decarbonization efforts to meet the goals of the Paris Climate Agreement, and new regulations and private initiatives are requiring accurate well-to-wake (WtW) greenhouse gas (GHG) emissions accounting. To ensure a level playing field, shipping companies, policymakers, and civil society must have access to reliable and complete information on the GHG emissions associated with different fuels and technologies. This isn't the case at the moment.

The lack of transparent and complete information is particularly evident when it comes to methane (CH_4) emissions from liquefied natural gas (LNG) dual-fuel engines. This complicates regulatory design and gives the illusion that LNG's climate advantages as a marine fuel are perhaps significantly better than they are in reality. This is worrying given that CH_4 is a highly potent greenhouse gas, which if unabated will undo any claimed CO_2 savings associated with LNG. LNG's popularity is also growing, accounting for 25% of containerships' and 44% of cruise ships' order books.[1]

Several industry players have claimed to have solved the CH_4 slippage in LNG engines, but these claims are often backed by incomplete information, and questioned by independent researchers who have found that CH_4 emissions are higher than previously thought, most recently via the FUMES report published by the ICCT and in cooperation with Explicit ApS and the Netherlands Organization for Applied Scientific Research (TNO).[2,3,4,5,6]

To solve this ongoing problem, **we call on marine engine manufacturers to publicly release granular data on CH_4 emissions from LNG-powered marine engines.** We request this information for the following engine types: Dual-Fuel Four Stroke Otto-cycle, Lean Burn Gas Engine (LBSI), Dual-Fuel Two Stroke Otto-Cycle, and Dual-Fuel Two Stroke Diesel Cycle. Specifically, we request the manufacturers to provide CH_4 emission rates in g/kWh or as a percentage of fuel consumption for the following load points: 5%, 10%, 15%, 20%, 30%, 40%, 50%, 60%, 70%, 75%, 80%, 90% of maximum continuous rating (MCR). The wide range of load points accounts for the strong impact of load on emission rates.[7,8,9,10,11]

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[1] Clarksons Research Database (accessed on February 12th, 2024).
[2] Comer, B., et al. (2024). Fugitive and Unburned Methane Emissions from Ships (FUMES): Characterizing methane emissions from LNG-fueled ships using drones, helicopters, and onboard measurements. International Council on Clean Transportation.
[3] Balcombe, P., et al. (2022), Total Methane and CO2 Emissions from Liquefied Natural Gas Carrier Ships: The First Primary Measurements, Environmental Science & Technology 56 (13), 9632-9640.
[4] Anderson, M., et al. (2015), Particle- and gaseous emissions from a LNG powered ship. Environmental Science, 49(20), 12568–12575;
[5] Corbin, J. C., et al. (2020), Characterization of particulate matter emitted by a marine engine operated with liquefied natural gas and diesel fuels, Atmospheric Environment, 220, 117030.
[6] Sommer, D. E., et al. (2019), Characterization and Reduction of In-Use CH4 Emissions from a Dual Fuel Marine Engine Using Wavelength Modulation Spectroscopy, Environmental Science & Technology, 53(5), 2892–2899.
[7] Van Roy, Ward, et al. (2022). Airborne monitoring of compliance to NOx emission regulations from ocean-going vessels in the Belgian North Sea. Atmospheric Pollution Research.
[8] Fridell, E. et al (2023). SCIPPER D5.5: Policy recommendations related to regulations, monitoring and enforcement. EU Horizon 2020 Project.
[9] Comer, B., et al. (2023). Real-world NOx emissions from ships and implications for future regulations. International Council on Clean Transportation.
[10] Knudsen, B., et al. (2022). NOx Emissions from Ships in Danish Waters. Explicit Aps and Ministry of Environment of Denmark.
[11] Knudsen, B., et al. (2022). Evaluating NOx Emission Inventories For Ocean-Going Vessels Using Real Emissions Data. Explicit ApS.

The shipping industry has been a latecomer in taking responsibility for climate change, and transparency will go a long way to help industry and policymakers make informed decisions about deploying alternative marine fuels. It will also increase the trust of civil society and policymakers in the alternative fuels offered as a solution to global warming, and stimulate much-needed investments for their large-scale deployment.

We thank you in advance.

On behalf of:

Transport & Environment
Solutions for Our Climate
Opportunity Green
Stand.Earth
High Ambition Climate Collective
Pacific Environment
Ocean Conservancy
Environmental Defense Fund
Friends of the Earth - United States
NABU (The Nature And Biodiversity Conservation Union)
Oceans North
Surfrider Foundation Europe
University of California-Berkeley Goldman School of Public Policy
Zero Emission Ship Technology Association
Zero - Associação Sistema Terrestre Sustentável
Green Transition Denmark
Zero Emission Resource Organisation
Green Global Future
Seas at Risk
Viking (Cruise Lines)
Royal Belgian Institute of Natural Sciences