

VKI Inquiry - Austrian Association for Consumer Information

1. *According to your homepage, the LNG propulsion of the MSC World Europa is up to 25% lower than conventionally powered ships. How does the comparison look if all greenhouse gas emissions (e.g. including methane) are taken into account?*

The use of liquefied natural gas (LNG) as a marine fuel achieves up to 25% lower carbon emissions when compared to conventional marine fuels such as heavy fuel oil (HFO) or marine gas oil (MGO). This is because the carbon content of LNG is significantly lower than HFO or MGO, and LNG contains more energy for a given mass than conventional HFO or MGO marine fuels. Emission factors are provided by the International Maritime Organization ([Marine Environment Protection Committee \(MEPC\) Resolution MEPC.245\(66\)](#)) and are consistent with those applied by the United Nation's Intergovernmental Panel on Climate Change (IPCC).

However, current engine technologies result in varying amounts of 'methane slip' or fugitive methane that escapes into the atmosphere from uncombusted fuel. When accounting for all greenhouse gas emissions, including methane on a CO₂-equivalent basis (28 tCO₂e/t CH₄), MSC World Europa emits up to 20% less GHG emissions than if she were powered by a conventional marine fuel. We are working diligently to assess and develop technologies that address the issue of methane slip, and are actively involved in the European Union's Green Ray Research and Development Project to assess and prevent methane slip from LNG engines. When developed, these technologies will be demonstrated onboard two new ships and retrofitted to one existing vessel, all of them targeting Technology Readiness Level 7. For an in-depth analysis of this issue MSC Cruises recommends the 2nd Life Cycle Greenhouse Gas Emission Study on the Use of LNG as a Marine Fuel by [Sphera](#).

Finally, the use of LNG as a marine fuel virtually eliminates all sulphur oxide (SO_x) and particulate emissions and reduces nitrogen oxide (NO_x) emissions by up to 85% compared to conventional marine fuels such as heavy fuel oil or marine gas oil, which also has local air quality benefits.

2. *What is MSC Cruises' position on the use of biofuels and related sustainability risks (competition with food production, pesticide use in the cultivation of eligible crops,...)?*

MSC Cruises recognizes the potential of biofuels and biogas to achieve significant lifecycle emissions reductions of up to 80%, or even greater. The industry is actively engaged in testing various biofuels, and we plan to accelerate the deployment of both biofuel and bio-LNG across the fleet in the near future. In accordance with our company policy any biofuel or biogas used must meet the sustainability criteria for advanced biofuels as defined by the European Union's Renewable Energy Directive (RED II). We will not purchase any biofuel that is not certified to an accredited international standard and verified by an independent third-party for its sustainability criteria and life-cycle emissions values.

To eliminate potential sustainability risks, MSC Cruises adheres to globally recognized standards such as International Sustainability & Carbon Certification (ISCC) and The Roundtable on Sustainable Biomaterials (RSB) to provide assurance of the use of advanced biofuels from industrial and/or agricultural wastes in our fleet. We anticipate that synthetic variants will gradually emerge in the longer term, but for now, we see the recent growth in European biogas production as especially promising.

3. *Through which measures does MSC support the research and development of green hydrogen so that it can be used in cruise ships?*

MSC Cruises is committed to accelerating the commercial deployment of green hydrogen in the markets where we operate. We are involved in a variety of different projects and initiatives, some of which are not yet public due to their commercially sensitive nature. However, MSC's efforts are sending a strong demand signal for future offtake agreements to both hydrogen producers and investors. MSC Cruises is also working closely with research institutions, academics, and industry partners to determine optimal designs for hydrogen-powered vessels and study the feasibility of delivering liquid hydrogen at ports where we operate.

MSC Cruises is part of Project CHEK, which aims to develop two bespoke vessel designs, one of which is a new generation of MSC Meraviglia-class cruise ship equipped with a hydrogen-powered engine that works with the aim of achieving a GHG emissions reduction of 99% and energy savings of at least 50%. We also plan to install significant fuel cell capability powered by green hydrogen on Explora ships V and VI which will be delivered before 2030 and represent a significant step forward toward our commitment of achieving net-zero emissions by 2050.

4. *How many ships in the MSC fleet are powered by heavy fuel oil (or heavy fuel oil blends)? What is the average heavy fuel oil consumption per day (in the context of a cruise)?*

We have 20 ships delivered before 2022 that can use heavy fuel oil (HFO) or low sulphur fuel oil (LSFO) based on applicable regulations. In 2022, our fleet consumed a total of 559,991 tonnes of HFO with all emissions treated using hybrid exhaust gas cleaning systems (EGCS) that reduce sulphur oxide emissions below 0.1% and 178,949 tonnes of LSFO. However, moving forward, MSC Cruises has no new heavy-fuel oil powered ships on its order books. The average heavy fuel oil consumption per day per ship can vary significantly depending on factors such as ship size, design, engine technology, itinerary, weather, energy efficiency measures, and more. On smaller ships, the consumption is around 40 tons per day, while on the largest ships, it can be over 100 tons per day.

5. *How many ships in the MSC fleet are equipped with soot particle filters? What measures does MSC take to reduce particulate matter?*

We are investigating potential particulate removal systems, as a retrofit in addition to the adoption of exhaust gas cleaning systems and selective catalytic reduction systems. However, particulate removal solutions for large marine applications are still under development by manufacturers and not yet available on the market. It's important to note that our transition to LNG on newbuilds virtually eliminates all particulate matter emissions; nonetheless, we will continue to explore retrofit solutions for our legacy fleet.

6. *How often is shore power used on MSC cruises?*

Shore power has been fitted on all new ships as standard since 2017 and a retrofit program has been established to ensure that any ship operating on a route where shore power is available is able to connect. In 2022 we completed retrofitting of MSC Poesia and MSC Preziosa and two additional ships are expected to be retrofit in 2023. MSC Cruises has committed to always using shore power in all ports where it is available to us. Unfortunately, as of today shore power facilities are not yet widely available in the ports we visit. However, we

are encouraged by initiatives under the European Union's Fit for 55 legislative package to require large European ports to provide shore power by 2030.

In 2022, MSC Cruises signed a Memorandum of Understanding with Cruise Baltic for the use of shore power in 32 ports and destinations in the Baltic Sea Region. By signing this agreement, Cruise Baltic will work to deploy shore power facilities across the region and MSC Cruises is committed to using shorepower in Baltic Sea ports where it is available, as soon as possible, and no later than from 1 January 2024. We are also engaged in similar initiatives that have been adopted in Barcelona, Marseille, Genoa, La Spezia, Miami, Oslo, Shanghai, Bergen and other ports worldwide. Most recently in February 2023, MSC Virtuosa has completed commissioning for shore power at the Port of Southampton, enabling the ship to regularly connect on its weekly visits to England.

The use of shorepower will enable our ships to shut off engines and eliminate all emissions while in port. We are encouraged by the growing share of renewables in the power production of European grids which will enable us to not only eliminate our Scope 1 emissions while in port but also improve our Scope 2 carbon footprint. Currently, our weekly visits to Southampton with MSC Virtuosa reduce the overall greenhouse gas footprint of the ship in port by around 80% when taking emissions from the regional electrical grid into account, while also eliminating all local air pollutants for the period when the ship is plugged in.

7. *When does MSC plan to start not only a relative reduction of CO2 emissions (carbon intensity - per ALB km), but also an absolute reduction of emissions?*

There is considerable uncertainty surrounding the availability and deployment of renewable marine fuels at scale. It is therefore difficult to pinpoint a precise timeframe for a peak in absolute emissions reductions; nonetheless, we anticipate that as these fuels increasingly become available and we begin to replace our legacy fleet with newbuilds that incorporate the latest environmental technologies we will begin to bend the curve in the next decade towards our firm commitment of net-zero emissions by 2050.

However, we are not passively waiting for technology solutions to arrive, and we are actively pushing to ensure our new ships are future proof. For example, MSC Euribia which arrives later this year will emit 19% less greenhouse gas emissions per passenger per day compared to her sisterships that use conventional marine fuels or 44% less greenhouse gas emissions per passenger per day than ships built only 10 years ago, and this is all before a single drop of bio-LNG is bunkered onboard.

The biogas industry is scaling rapidly, and prices are becoming more affordable, but to accelerate widespread adoption, the cruise industry also needs regulatory certainty. While MSC Cruises is already committed to achieving net-zero emissions by 2050, we expect the regulatory landscape to evolve further in the coming years towards a mandatory net-zero emissions future and we will need to regulatory framework to support it.

8. *When does MSC plan to commission the first carbon neutral cruise ship (taking into account all greenhouse gas emissions, not just CO2)?*

Although the concept of "carbon neutral ship" can be broadly interpreted, MSC Cruises is committed to achieving net-zero emissions by 2050 without the use of carbon offsets or other out-of-sector compensation measures. While a truly net zero emissions contemporary cruise ship is unlikely to emerge in this decade, we are exploring various pathways to decarbonization, including ship design, energy efficiency, new technology, and fuels. In the near term (2025-2035), the focus will be on shifting toward renewable fuels; advanced biofuels

can achieve an 80% reduction in overall lifecycle emissions when compared with conventional marine fuels. A full transition to renewable fuels remains challenging today as the production has not reached the scale required. In the longer term (2035-2050), hydrogen and synthetic hydrogen-derived fuels, like green methanol, are currently viewed as the most promising pathways to full decarbonization of the cruising sector. However, global renewable energy production, synthetic fuel production, and the availability of distribution infrastructure will need to accelerate rapidly to make this possible.

9. *What role will offset measures (e.g. reforestation projects) play in MSC's path to net zero emissions by 2050?*

MSC Cruises is committed to achieving net-zero emissions by 2050 by focusing on reducing its own emissions rather than by compensating for them through investments in other sectors. Therefore, carbon offsets or similar compensation schemes are not considered under MSC's commitment to achieve this goal. However, the company envisions a role for permanent removal solutions like carbon capture and storage and is closely following recent developments in direct air capture and sequestration technologies to address any residual emissions that may remain in 2050 and as a source of the biogenic carbon that is required for advanced fuels.

While MSC Cruises is not using reforestation projects or other natural carbon compensation measures to address its emissions, the company is actively involved in preserving biodiversity and the natural environment. For example, we transformed a former industrial sand excavation site into a flourishing marine reserve in The Bahamas called Ocean Cay. MSC Cruises cleaned up the industrial waste on and around the island and provided a safe, natural habitat for marine life and seabirds. MSC Cruises is also constructing a new Marine Conservation Center on Ocean Cay to work with academics and environmental experts to identify and propagate hardy species of coral capable of surviving rising ocean temperatures in the Marine Reserve.