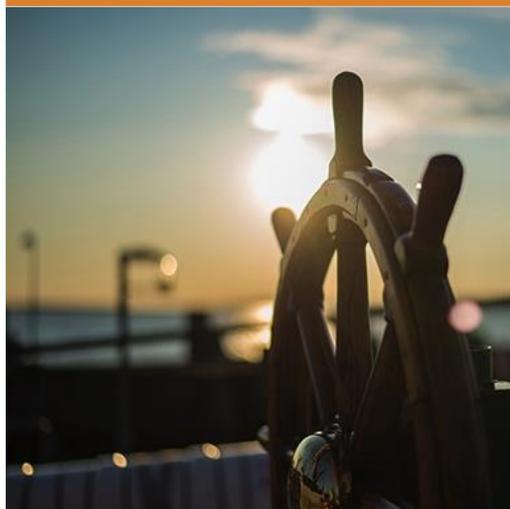


THE GLOBAL CRUISE INDUSTRY

Pioneering Innovations to Advance Environmental Sustainability



For the global cruise industry, sustainable seas and thriving destinations are not only an important environmental goal but a business imperative. As environmental technology has advanced, our industry has adopted new innovations to improve sustainability.

Following are examples of important technologies that CLIA Cruise Lines deploy to protect the oceans, air, and destinations that millions of passengers enjoy.

Exhaust Gas Cleaning Systems (EGCS)

WHAT ARE THEY?

- EGCS are designed to remove 99% of sulphur and well over 50% of particulate matter, including elemental and organic carbon, from ship emissions. Catalytic filters and other systems further reduce particulate matter by over 30% and nitrogen oxides by 10%. EGCS are part of the cruise and shipping industry's strategy to meet or exceed the IMO sulphur cap going into effect in 2020. From 1 January 2020 all vessels will be required to use low sulphur fuel or an EGCS to reduce emissions.

WHAT IS CRUISE DOING?

- The cruise industry was an early adopter of ECGS technology. As a result, the ECGS industry has matured to help reduce sulphur and particulate matter in shipping overall.
- 111 cruise ships, with a capacity of more than 305,000 passengers, have been fitted with ECGS.
- 12 additional ships are being retrofitted with ECGS, 30 more are scheduled to be retrofitted, and 27 new ships, with a capacity of nearly 100,000 passengers, will have ECGS.
- This includes different types of ECGS technologies:
 - Open Loop ECGS
 - Hybrid ECGS
- Beyond this, several technologies help clean the wash-water stream, including fine-mesh filtration, water purification, centrifugal separation and the use of a clarifying agent that combines particles to ensure more effective filtration.
- Wash-water filter residuals and process tank residuals are disposed of in designated port facilities – never in the ocean.

Cleaner Fossil Fuels

WHAT ARE THEY?

- Some types of oil are specially formulated to reduce emissions significantly over traditional fuels. Cruise is increasingly using these fuels in all parts of the world, and exclusively in sensitive waters designated as Emissions Control Areas (ECAs) by the International Maritime Organization.

WHAT IS CRUISE DOING?

- Ships use Marine Gas Oil in many regions to comply with ECAs and elsewhere required by regulation.
- Ships may also use Very Low Sulphur Fuel Oil or Ultra Low Sulphur Fuel Oil in these regions, further reducing emissions.

Liquefied Natural Gas (and Alternative Fuels)

WHAT ARE THEY?

- Greater use of liquefied natural gas (LNG) and alternative propulsion energy such as fuel cells hold the promise of lower, and even zero, emissions. LNG-fueled ships emit no dust, soot or particles, and LNG is expected to reduce sulphur emissions by more than 99% and nitrogen oxide emissions by up to 85%, compared to conventional fuels.

WHAT IS CRUISE DOING?

- More than one-third of all new ships being built, 25 ships total, will use LNG as their primary propulsion fuel.
- 2 ships are able to use LNG while in port, reducing emissions in port cities.
- Over 70% of the cruise fleet – 152 ships – are already “dual fuel” ships, able to use alternative fuels such as methanol and biodiesel as well as traditional fossil fuels.
- Fuel cell technologies are another promising technology currently under study.
- Ship lifecycles, suitable infrastructure and the availability of alternative fuels all play a role in determining whether CLIA Cruise Lines can take advantage of new propulsion methods.

Shore Power/Cold Ironing

WHAT IS IT?

- Shore power provides electricity to the ship by connecting to a port’s electric grid. Greater use of shore power reduces ship emissions and, depending on the ultimate source of the shore power, can reduce total emissions.

WHAT IS CRUISE DOING?

- Fifty-five ships, over 27% of total capacity, are fitted with shore-side electricity systems and thus able to use shore power where available. An additional 11 ships are planned to be retrofitted with these systems. Seventeen new ships will be fitted with them as well.
- Thirteen ports that CLIA Member Line ships visit have at least some capacity for use of shore side electricity: Brooklyn, Halifax, Hamburg Altona, Montreal, San Diego, San Francisco Berth 27, Kristiansand, Los Angeles, Long Beach, San Pedro Berths 92 & 93, Seattle, Shanghai, Vancouver Canada Place, and

Juneau. Keep in mind that in order to effectively cut emissions, shoreside power must come from clean, efficient sources.

Other Energy Efficiency Technologies

WHAT ARE THEY?

- CLIA Cruise Lines are also deploying a variety of other technologies designed to increase fuel efficiency and reduce emissions, and the use of these technologies is expected to grow in the future.

WHAT IS CRUISE DOING?

- Ships representing more than 92% of total cruise industry capacity use low friction hull coatings which reduce emissions by increasing efficiency and lowering fuel consumption.
- Air lubrication systems, an advanced technology that reduces friction between a ship’s hull and the surrounding seawater, help increase efficiency and lower overall fuel consumption.

Waste Water Reduction Technologies

WHAT ARE THEY?

- An important part of environmental protection for ocean health is reducing and treating waste water. New technologies, designed to comply with environmental regulations for especially sensitive waters, represent significant advances in this effort.

WHAT IS CRUISE DOING?

- CLIA’s Waste Management Policy prohibits the discharge of untreated sewage at sea, anytime, anywhere, around the globe.
- CLIA Cruise Lines must process all sewage through treatment systems that meet or exceed international requirements prior to discharge.
- All new ships are fitted with Advanced Wastewater Treatment Systems that are more advanced than most, if not all, of the wastewater treatment plants used by coastal municipalities in the U.S. Ships that sail the Baltic Sea and Alaskan waters meet an even higher waste water standard. In fact, CLIA Cruise Lines already comply with IMO Baltic waste water regulations set to come into force in 2021.