OXFORD ECONOMICS

CLIA

AUGUST 2020 CLIA HIGHLIGHTS

ENVIRONMENTAL COMMITMENT, INNOVATION AND RESULTS OF THE CRUISE INDUSTRY

$23.5 BILLION

Invested in new energy efficiency technologies and cleaner fuels

40% TARGET

Reduction in rate of carbon emissions by 2030 (compared to 2008)

ADVANCED WASTEWATER TREATMENT SYSTEMS (AWTS)

AWTS systems utilize advanced tertiary-level treatment to generate effluent discharges often equivalent to best shoreside treatment plants and, consistent with CLIA policy, well beyond international requirements.

99% NEW CAPACITY

on order specified to have these systems (bringing global capacity to 78.5%)

70% GLOBAL CAPACITY

is served by advanced wastewater systems (5% increase in global capacity over 2019)

LIQUIFIED NATURAL GAS (LNG)

LNG has virtually zero sulfur emissions, a 95% to 100% reduction in particulate emissions, an 85% reduction in NOx emissions, and up to 20% reduction in greenhouse gas emissions.

25 LNG-POWERED

ships currently ordered or under construction

49% NEW CAPACITY

committed to rely on LNG for primary propulsion (51% increase in future global capacity over 2018)

EXHAUST GAS CLEANING SYSTEMS (EGCS)

EGCS reduces sulfur oxide levels by as much as 98%, a typical total particulate matter reduction of 50% or more, including elemental and organic carbon and black carbon, and nitrogen oxides by up to 12%.

69% GLOBAL CAPACITY

utilizes EGCS to meet or exceed air emissions requirements (up 25% over 2018)

96% NEW PASSENGER CAPACITY

not relying on LNG will have EGCS installed (up 21% over 2019)

SHORE-SIDE POWER CAPABILITY

Cruise ships may operate on shore-side electricity at 14 ports worldwide, reducing overall emissions while at port.

32% GLOBAL CAPACITY

are fitted to operate on shore-side electricity (up 13% over 2019)

25% TO BE RETROFITTED

with shore-side electricity systems (capacity up 47% over 2019 & over 500% over 2018)

50% NEW SHIPS

on order will be fitted with shore-side electricity systems (27% increase over 2019)

Environmental Technologies and Practices
CLIA Global Oceangoing Cruise Lines - August 2020

This table provides aggregated data across CLIA's global oceangoing cruise line membership. The table reflects the number of ships equipped with certain technologies, corresponding passenger capacities (lower berth at double occupancy) and the percentage of the entire fleet represented.

	AUGUST 2020			
INVESTMENTS, COMMITMENTS AND PRACTICES	**SHIPS REPORTING** (272 Total)	**CAPACITY LOWER BERTH DOUBLE OCCUPANCY** (559,996 Est. Total Fleet)	**AGGREGATE % OF REPORTING CAPACITY**	**NOTES**
Oceangoing Ships Reporting	258	551,610	98.5%	Cruise lines continue to transform the modern fleet to protect the oceans, air and destinations enjoyed by millions of passengers each year. CLIA's Environmental Protection Policy is available here. Each year, cruise line CEO's verify implementation as a condition of membership. The Policy is incorporated into each ship's Safety Management System (SMS) and is subject to third party and internal auditing. Additional environmental reports, including third party research on air and waste water performance, are available here. Many individual cruise line sustainability reports are publicly available on company websites. Note the 'New Ship on Order' and 'Ships (to be) removed' statistics are dynamic and subject to fluctuation as a consequence of the pandemic.
New Ships On Order	76	211,904		
Ships (to be) added to the fleet between 1 January and 31 December of 2020	18	36,337		
Ships (to be) removed from the fleet between 1 January and 31 December of 2020	4	5,643		
Average age of fleet as of 1 January of 2020	15.5			
EXHAUST GAS CLEANING SYSTEMS (EGCS)				
Ships fitted with exhaust gas cleaning systems (EGCS)	136	381,644	69.2%	EGCS systems remove 99% of sulfur & well over 50% of particulate matter, including elemental & organic carbon. Catalytic filter & other systems further reduce particulate matter by over 30% & nitrogen oxides by up to 12%. Existing & forecast EGCS installations are for hybrid or open loop systems and many include wash water filters. Some include a catalytic filter on the engine exhaust prior to the EGCS, as well as continuous monitoring equipment to automatically record all parameters. A variety of technologies further clean the EGCS wash water stream including fine-mesh filtration, purification, centrifugal separation & dissolved air with flocculant. EGCS wash water filter residue & process tank residue are disposed of ashore. EGCS wash water sample analysis shows that average PAH and nitrate levels are well below IMO wash water criteria and there is little to no contribution from the EGCS process to concentrations of a number of trace metal parameters (Arsenic, Cadmium, Lead, Mercury, Selenium and Thallium). Sample analysis shows average wash water concentrations are below the limits for comparable land-based industrial point source waste water standards and average wash water concentrations also compare favorably to
- Ships fitted with open loop EGCS	85	217,658	39.5%	
- Ships fitted with open loop EGCS and additional wash water filters	58	145,952	26.5%	
- Ships fitted with hybrid EGCS	51	163,986	29.7%	
- Ships fitted with hybrid EGCS and additional wash water filters	35	115,292	20.9%	
New ships on order committed to be fitted with EGCS	37	103,034		

				water quality standards with strict criteria. Studies are available here and here. MAMPEC computer modeling suggests that that the impacts of using exhaust gas cleaning systems in open loop mode are small and that in most ports, and for most substances, the increase in concentrations attributable to EGCS wash water is less than 0.1% of the limit values in the new European Environmental Quality Standards (EQS) for priority substances for 2021 and onwards under the Water Framework Directive 2013/39/EU. A link to the CE Delft Report can be found here.
LIQUIFIED NATURAL GAS (LNG)				
Ships able to operate on LNG in port	4	17,024	3.1%	LNG has virtually zero sulfur emissions, a 95% to 100% reduction in particulate emissions, an 85% reduction in NOx emissions, and up to a 20% reduction in greenhouse gas emissions.
New ships on order committed to use LNG as primary fuel for propulsion	25	104,158		
ALTERNATIVE FUELS				
Ships capable of using alternative fuels other than LNG (methanol, biodiesel etc.)	179	402,670	73.0%	Many cruise ships are equipped to operate on both biodiesel and traditional fossil fuels. Several companies continue to explore fuel cell and equivalent technologies for future new builds or retrofit projects. Ships use Marine Gas Oil (MGO) in many regions to comply with IMO ECAs (North America & Caribbean Sea, North Sea and Baltic Sea), EU Mediterranean Sea ports, the Arctic, China's emission control area, Australian ports and to meet other locally imposed requirements. Ships may also use Very Low Sulphur Fuel Oil (VLSFO) or Ultra Low Sulphur Fuel Oil (ULSFO) in these regions to comply with emissions requirements. Ships fitted with EGCS will generally use this equivalent technology unless its use is not permitted and will use MGO where specifically required. In December 2019, the cruise industry joined other maritime industry associations to sponsor a proposal to IMO to establish the world's first collaborative International Maritime R&D Board (IMRB), which aims to generate around $5 billion over a ten-year period to identify the technical and operational solutions associated with the deployment of zero-carbon fuels and propulsion technologies. These solutions will be required in order for international shipping to satisfy the IMO's Vision and Levels of Ambition in its *Initial Strategy on Reduction of GHG Emissions from Ships*.
SHORE SIDE ELECTRICITY				
Ships fitted with Shore Side Electricity (SSE) systems	68	177,482	32.2%	The following 14 ports / specific berths visited by CLIA oceangoing ships are fitted with shore side electricity capability: Greater than 10MW: Brooklyn, Halifax, Hamburg Altona, Kristiansand, Montreal, San Diego, San Francisco Berth 35, Los Angeles, Long Beach, San
Ships planned to be retrofitted with SSE systems	66	136,240	24.7%	

New ships on order committed to be fitted with SSE systems	38	124,760		Pedro Berths 92 & 93, Seattle, Shanghai, and Vancouver Canada Place. 7-9 MW: Juneau
ADDITIONAL AIR POLLUTION & ENERGY EFFICIENCY TECHNOLOGIES				
Ships fitted with particulate filters	36	97,948	17.8%	Some ships equipped with Selective Catalytic Reduction systems (SCR) use them in every port and when transiting inbound and outbound.
Ships fitted with Selective Catalytic Reduction (SCR) Systems	17	31,232	5.7%	
Ships capable of complying with NOx Tier III limits	17	30,915	5.6%	
Ships that have air lubrication systems fitted	15	53,574	9.7%	
Ships with low friction anti-fouling hull coatings installed	204	421,252	76.4%	
WASTE WATER				
Ships that have an advanced waste water treatment system on board, approved, used and capable of meeting or exceeding IMO MARPOL Annex IV discharge norms	168	386,524	70.1%	Many ships are equipped with advanced waste water treatment systems (AWTS) that are capable of exceeding MARPOL Annex IV requirements and are operated to meet or exceed the more stringent sewage discharge criteria in Alaskan waters and/or the forthcoming Baltic Sea Special Area, as well as gray water requirements under the U.S. Vessel General Permit (VGP). CLIA members recognize the extraordinary eutrophication situation in the Baltic Sea. While the requirements of the IMO Baltic Sea Special Area do not take effect for existing ships until 2021, by CLIA Policy, when operating in the Baltic, ships are to discharge MARPOL Annex IV waste ashore where adequate port reception facilities are available under a 'no special fee' arrangement. By CLIA policy, bio-residual from advanced waste water systems may be landed ashore, dried and incinerated or discharged at sea when the ship is more than 12 nm from nearest land while moving at a speed greater than 4 knots.
New ships on order that will have an advanced waste water treatment system on board, approved and capable of meeting or exceeding IMO MARPOL Annex IV discharge norms.	75	212,984		
Ships that have a waste water treatment system on board, approved and capable of meeting the discharge standards of the IMO MARPOL Annex IV Baltic Sea Special Area	40	82,382	14.9%	
OTHER (NEW IN 2020)				
Ships with a Biofouling Management Plan	237	545,953	99.0%	
Ships fitted with Water Fuel Emulsion (WFE) technology/treatments	64	148,185	26.9%	