

# innovations

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## Sustainability and the Environment



*Hurtigruten is building the world's first hybrid powered cruise ships*

**Special Report**  
International Cruise Ship Industry

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# Environmental concerns drive operational changes

A diverse group of industry leaders were involved in a round table discussion on future cruise ship sustainability in today's environmentally sensitive world.

The debate was held in London recently, organised by IMMEDIASEA and attended by International Cruise Ship Industry (ICSI), among others.

Setting the scene was **Jan Kjetil Paulsen**, Senior Advisor Shipping of Norwegian-based NGO Bellona, who said there were currently around 93 cruise ships on order and the current fleet has an average age of 20 years, which will fall.

With the increase in the number of ships and their guests, there will be pressure put on destinations, while globally, the climate linked to emissions will be impacted, he said.

In the cities, vessels' exhausts, particle emissions, smog, health issues for the local population, must be offset against the extra revenue for the local communities that cruise ship guests bring going forward.

He gave examples of future requirements that could affect the cruise sector, such as the World Heritage Norwegian fjords becoming 'no smoking' zones and talk of banning the burning and carrying of heavy fuel in the Arctic, due to the threat of soot on ice, which would create an extra warming effect, leading to increased melting and a threat to the local animal life.

He stressed that ships built today will last for 30-40 years and asked - what new regulations and requirements can we expect in that time? Some new requirements could result in stranded assets, he warned.

Today, local regulations include ECAs, but in the future there could be zero emission zones and 'fossil fuels forbidden here' notices appearing.

As for global greenhouse gas emissions, the IMO is expected to deliver a draft recommendation in April, 2018. Paulsen also warned that the EU emissions trading scheme (ETS) will be implemented if the IMO fails to come up with a solution.

Turning to more practical issues to combat emissions and other operational considerations,

Carnival's senior vice president for maritime affairs, **Tom Strang**, gave a short resume of what the corporation and its brands are currently doing to mitigate the vessels' footprint on land and at sea.

Initiatives include the fitting of exhaust gas cleaning systems (EGCS), operating cruise ships with LNG as fuel, cold ironing at certain ports and investing in equipment to reduce wash water and waste.

He said that 161 EGCS had been fitted on 64 ships and claimed that this particular system works. He also claimed that the vessels' wash water was now clean and said this had been independently verified.

Some 36 ships had been fitted for cold ironing whereby the vessels can plug into the terminal's power systems thus saving the use of generators in port. However, he said that there was only two ports in Europe that could offer this service.

While admitting that LNG was not the panacea for the future, he said that this fuel had the best emissions profile with a 15% well to wake, 90% particulate matter reduction and a 75% NOx emissions reduction. He also said that different requirements in each country for LNG bunkering was a challenge but that education was the way forward.

What's next? he asked. Carnival is currently looking at fuel cell usage, waste heat recovery systems and HVAC systems, the use of turbochargers and air lubrication systems.

"Are fuel cells the answer to everything? We are not sure but probably for the hotel side," he said.

At the other end of the scale in terms of ship size is Hurtigruten. **Rune Thomas Ege**, Vice President Global Communications admitted that the company, known for its daily Norwegian coastal express service, had not been very adventurous until now.

However, this is about to change, he said, as the company has ordered two expedition cruise ships, which are claimed to be the world's first hybrids fitted with battery packs for propulsion. "They save fuel and money - a no brainer," Ege said.



*Hurtigruten's Rune Thomas Ege explained the company's new philosophy*

He explained that there was a huge rise in demand for Polar expedition ships with many people now putting this type of cruising on their 'bucket lists'. He also said that the more adventurous and the repeat guests were looking for operators showing sustainability.

An expedition traveller is a well educated, 40 plus, affluent person, passionate about learning more about the environment and as a result, the new vessels' would include an expanded lecture programme, Ege explained.

He also advised everyone to think outside the box, for example replacing plastic with aluminium to protect the environment.

"We need to move faster to a sustainable solution. We could do more, for example, avoid having the same ships in the same place," he said. Hurtigruten also involves the local community along the Norwegian coastal route by, for example, ordering all the eggs needed on board from the same supplier.

The company stopped using heavy fuel oil about two years ago and is looking for other solutions going forward to compliment the battery packs.

## Inter-connecting data

Wärtsilä's **Juha Kytölä**, Vice President, Environmental Solutions, said that fleet optimisation, the efficient use of resources and connectivity to ports were key to ship operations together with better integration of equipment and inter-connecting data.

He thought that LNG fuel logistics could be well managed today but described it as a 'chicken and egg' situation.

There will be multiple solutions and choices available to attain vessel efficiency, such as LNG, hybrid propulsion, batteries, biofuels, fuel cells, hydrogen, etc. For example, batteries could be recharged using a contactless method, as the technology available will be greater in the future, he said.

DNV GL's **Helge Hermundsgard** thought that the main environmental concerns for the cruise industry going forward were air (CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>, PM); water (black, grey and ballast); waste (garbage, etc); plus others, including noise both above deck and underwater and finally the impact on the destination itself.



*DNV GL's cruise ship expert - Helge Hermundsgard.*

He agreed that LNG as a fuel is a good solution today, but won't be a long term solution. There are only a few options available to attain a carbon neutral vessel operation, but he said an area to watch is the development of synthetic fuels.

Batteries were ideal for peak shaving; LNG was the best we have

today and hydrogen was perfect for ferries but expensive. "There is no silver bullet," he said. "Planning for a ship for 2025 is a tough responsibility."

Hermundsgard also thought that batteries were currently too big. "We need to be flexible in the future. Connectivity and the start of artificial intelligence will increase going forward," he said.

## Increased efficiency

As for future increased propulsion efficiency, engines might reach 60-70%, Strang said. LNG takes up more space on board a vessel in terms of larger and extra tanks. Kytölä thought there would be multiple solutions, so a flexible approach was needed. He thought that biogas, being methane, was a good concept for the future.

**Petter Korslund**, Sales Director, Jotun Marine Coatings, said that on board sensors had improved and products will be optimised for different ship types.

Strang said that there was an opportunity to come up with a new platform, looking at a design and deciding what would be the best fuel option, stressing that this would be environmentally driven. Continuing on the theme of LNG as a fuel, he claimed that the problem of methane slip was continuously falling.

He also stressed that there is a lot of data available and co-operation was needed with equipment suppliers, such as Carnival's agreement with Wärtsilä. Kytölä naturally agreed saying that combining shipboard data will be optimised. A Master could also help optimise the data from one ship to another.

Ege advised cruise vessel operators to get the whole company behind a solution and engage the crew at all levels of decision making.

He explained that Hurtigruten has a 'clean sheet' on the two new ships and different experiments will be undertaken as each ship will be allocated its own projects. "Restructuring the company a

few years ago gave us the push we needed to start," he explained.

As for sensitive environments, Ege explained that in Antarctica, vessels were only allowed to disembark 200 guests per day and if a vessel arrives with say 500 people on board, the guests were prohibited from landing.

Strang advised co-operating with destinations and speaking to local communities. "Recognise that there is a challenge and talk to everyone," he said. He explained that both China and Japan were currently looking at their environments and investment in environmental solutions was happening at a faster pace.

He concluded by saying that Carnival is committed to investing in continuous improvement in vessel operations.

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