COVER STORY

Improved ship energy efficiency requires:

- holistic approaches to ship management
- energy audits and performance monitoring
- use of larger vessels

Focus on efficiency

Peter Drennan talks to **Dr Zabi Bazari,** ship energy services at Lloyd's Register, about what the industry can do to improve its energy management.

The demands of a booming cruise industry have seen larger ships, and more of them, calling at a wider roster of ports than ever before. Cruise lines now offer destinations from Antarctica to Alaska, where the key attraction is a pristine environment. Mindful of the need to keep them that way, and committed to comply with international regulations such as the MARPOL annex that governs NOx and SOx emissions (oxides of nitrogen and sulphur), and voluntary codes such as the International Maritime Organisation's CO2 index, cruise lines have invested heavily in state-of-the-art waste-handling systems, recycling, wastewater treatment, ballast water management and emissions-reduction technology.

But with fuel contributing up to 40% of the operational costs of a passenger ship, it is the spiralling price of oil that has proved the greatest catalyst for managing and reducing fuel consumption, says Dr Zabi Bazari, technical manager, Ship Energy Services, Marine Consultancy Services, at Lloyd's Register EMEA in London. Record crude oil prices have exerted significant pressure on profits, and the outlook remains challenging.

A holistic horizon

Bazari suggests that by taking a holistic view of ship energy management, a significant reduction in fuel consumption and CO2 emissions can be achieved. 'We believe that energy management is a process, and not a job done and finished,' he says. 'For every successful management process, you need to know the gaps, plan to close those gaps, implement the plan, monitor performance and evaluate. We take a similar view when we advise ship owners/operators on how they can reduce consumption.'

In order to optimise the fuel consumption of existing ships, Lloyd's Register advocates a combination of energy audits, performance benchmarking, energy projects implementation and performance monitoring. 'For those companies that pay for their fuel, we strongly recommend a proper energy management system to embrace this holistic view,' Bazari says.

Benchmarking allows an evaluation of the ship's performance, and that of its main machinery, against industry standards or best practice. An energy audit, conducted jointly with a ship's operator, evaluates ship and machinery performance, as well as non-technical aspects such as operational management, to identify areas of inefficiency.

Typically, such an audit will yield a series of recommendations for optimising fuel use and reducing emissions. Performance monitoring ensures compliance with best practice and supports continuous improvement.

Positive navigation

The cruise industry, less able to pass on rising fuel costs than cargo ship owners, has been proactive in investigating ways of reducing its fuel consumption, Bazari says.

'We carried out an energy audit of one cruise ship that was consuming fuel in the order of $40 million a year at current fuel prices,' he says. 'Our audit report gave a series of recommendations showing that they could reduce their fuel consumption by as much as 20%.' The proposals included itinerary changes, retrofitting new equipment and machinery, and improving operational/technical management of the vessel.

'The response of the company to our report was quite positive,' he adds. 'They employed an energy conservation manager and pursued our recommendations, plus some others that they had developed internally. Of course, they planned from short to long term, with aspects such as itinerary optimisation for the longer term.'

Asked whether such audits should be mandatory, Bazari is circumspect. 'I think such audits should be regarded as best-practice standards for industry and not mandatory,' he says. 'As best-practice standards, they can become a requirement by those who seek such operational standards. For example, in cargo shipping, charterers who pay for the fuel could make the uptake of such an audit a requirement as part of their wetting operations. In cruise shipping, bigger companies may choose to perform such an audit as part of their energy management policy.'

Grand design

For new ships, Bazari advocates a broad approach to ship design,taking into account the proposed operating profile and managing plant selection accordingly. With little respite likely from rising fuel prices, Bazari believes a more energy-efficient ship may soon pay for itself.

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To reduce the fuel consumption of a future generation of ships, he recommends moving to larger vessels in line with the industry trend. 'It is well known that larger ships have a lower fuel consumption and operational cost per unit of activity,' he says. He also suggests fully integrated, heat recovered and electronically controlled propulsion and power-generation engines.

'Shipyards can definitely play a more effective role in the uptake of these technologies,' he says. 'High fuel prices have helped make them more cost effective now than ever before.' wc

Dr Zabi Bazari profile

Dr Zabi Bazari is technical manager of Lloyd's Register's ship energy services. Bazari joined Lloyd's Register in1990 as a technology expert in diesel engines and thermal power systems. He is a member of the UK's Energy Institute and the Institution of Mechanical Engineers and has published more than 30 written papers. He is also the recipient of the 1992-93 IMarEst's Denny Gold Medal, the Stanley Gray Award on Marine Technology and the Percy Jackson Award.