



Clean shipping

Under increasing pressure to improve efficiency, growing freight shipping adopts a range of alternative policies and power systems.

Shipping already accounts for nearly 4.5% of the world's greenhouse gas emissions and, as the volume of global trade continues to grow, this proportion is also set to rise. According to the UN, annual emissions from the world's merchant fleets exceeds 1.2 billion tonnes of CO₂, twice that of the aviation sector. While planes and cars have been a common focus in the popular media, in the think tanks and transport forums around the world, ships have been rising up the agenda. Not surprisingly, then, this is now a growing concern for many governments seeking to take steps to reduce not only CO₂ emissions but also other environmental impacts such as waste contamination. As a result, people are turning to the concept of clean shipping and the benefits that it can potentially provide.

Shipping is a vital cog in the world's trade machine. Most people are unaware that almost every product is transported by sea at some stage. Put simply, when it comes down to shifting material around the planet, ships offer the best option, particularly when it comes to bulk transport of ore, coal, oil and cereals for which there is no alternative. For consumer goods and foods, the only option is the far more costly one of air freight. As a result the global shipping industry is booming.

Currently, maritime transport is handling around 90% of all world trade and is rising steadily. Over the

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past decade, the number of cargo miles has doubled from 20,000 billion to around 40,000 billion tonne-miles. With the world economy set to continue to expand steadily through to 2020 and beyond, many see that this figure will again double over the next decade. In addition, from an economic perspective, since freight rates are very competitive, companies tend to keep old ships in service for longer than originally planned. This means that while some ship owners are trying to improve efficiency, many others operate their ships as cheaply as possible and just follow the minimum regulations.

Comparing air and sea transport is an issue that several people have been focused on in recent years. In his book *Sustainable Energy – Without the Hot Air*, David Mackay, Professor of Physics at Cambridge University, makes some highly relevant points on the movement of people: 'For a time, I thought that the way to solve the long-distance transport problem was to revert to the way it was done before planes: ocean liners. Then I looked at the numbers. The sad truth is that ocean liners use more energy per

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passenger-kilometre (pkm) than jumbo jets. At a typical 85% occupancy, the energy consumption of a tourist class liner is 121 kWh per 100 pkm – more than twice that of the jumbo jet.' He also sees that, in the freight world, 'international shipping is a surprisingly efficient user of fossil fuels. But fossil fuels are a finite resource, and eventually ships must be powered by something else. Bio-fuels may work out but another option will be nuclear power.'

Others, however, see that there are major efficiency improvements to be gained in shipping beyond just a switch of power source. Better navigation, new fuel consumption software and advanced materials are in the repertoire, but clean shipping is increasingly seen as a key part of the solution. A clean ship is one designed and operated so that it maximises the opportunities for improved energy efficiency and reduced environmental impact. Over the past few years, momentum for change has been building and specific areas for new approaches are being addressed: slower speeds, better hydrodynamics and new power generation technologies are being adopted to improve overall fuel efficiency; low sulphur fuels are being introduced to reduce exhaust emissions to the air; waste reduction and onboard recycling is increasing to reduce to zero the refuse, sewage and cargo discharges to the sea.

Companies and governments around the world are planning to change the status quo and are adopting

clean ship strategies. For example, twenty-seven countries in the North Atlantic have signed the Paris Memorandum of Understanding and agreed to control visiting ships in their ports. In addition, the International Maritime Organization, the UN agency responsible for ship safety and environmental protection, is introducing higher regulatory standards.

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Cargo owners are starting to specify environmental performance targets for ships that are used to transport their goods and cradle-to-grave environmental footprinting is bringing wider consumer attention to the shipping issue. At the same time, financial incentives – such as lower insurance costs for clean ships – are being introduced and several governments and port authorities are planning larger fines for polluters. In June 2010, Lloyds Register, the London-based ship classification and risk organisation, announced that it is working on providing a verification service to ship owners that is approved by the Clean Shipping Project,

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the organisation that developed the Clean Shipping Index, which analyses the environmental impacts of shipping – another structural shift for the maritime industry that is nudging it towards its own ranking of ships by environmental performance.

So, what will shipping look like in 2020? More organisations now forecast that, by 2015, a significant number of clean ships will have been built and will be being introduced. By 2020, the nature of the overall merchant fleet will be changing. Most significantly from an overall emissions perspective will be the adoption of new fuel and power options that are already available or coming on stream soon: nuclear-powered vessels are common in the navy and are increasingly being adopted for merchant fleets; more ships are using liquefied natural gas (LNG) to fuel their engines, which are significantly cleaner than marine diesel ones; fuel cells are being developed for marine applications; solar power is being used

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for onboard equipment; wind-assisted propulsion is being reinvented, ranging from the use of large kites to pull vessels along to the reintroduction of high-tech sails that can work with other power options and provide 30% of the energy required.

At the same time, new designs of ship hulls are being introduced that reduce friction and so reduce energy consumption. Low-friction paint coatings are also becoming available. We can also expect to see pentamarans – fast cargo ships with five hulls that fill the gap between expensive air transport and slow traditional ships. Clean ships will become a common point of discussion, and not just in specialist transport forums.



Related insights



Page 95



Page 219



Page 223