

ENERGY  
TRANSITIONIRRESISTIBLE FORCE MEETS...  
THE TROUBLED VOYAGE TO GREEN SHIPPING**Emerging technologies for zero emissions shipping are presenting new dilemmas.****Key takeaways**

- As an environmental laggard, shipping must prepare for a decade that will usher in tougher requirements for cutting emissions
- Absent a single viable technology for zero emission propulsion, the industry faces many years of difficult investment choices
- Newer technologies like lithium-ion batteries and automated vessels will present significant challenges and risks that need to be addressed by many stakeholders

Is there any challenge amid the vision of a net zero global economy greater than taking shipping green? At first glance, green proofing a mode of travel that for centuries relied on wind power seems one of the easier steps in getting transport to zero emissions, yet the international shipping community is lagging far behind peers. In a period in which electric cars are rapidly expanding their reach, hydrogen trucks are rolling out and there are rapid advances in sustainable aviation fuel (SAF), ship owners are stuck with a series of short-term compromises and economic choices on the horizon. After all, the shipping industry generates around 2.5% to 3% of global greenhouse gas emissions and nations and major companies in other sectors are lining up to announce net zero commitments. Whilst shipping is transitioning to low sulphur fuel (LSF) and the use of sulphur cleaning devices called 'scrubbers' to permit the use of cheaper heavy fuel oil (HFO), this situation has in the last five years begun to look increasingly untenable. Tom Walters, a contentious marine expert at HFW, says the status quo "has only been sustainable for the time that the green revolution didn't have a voice. Now it has a voice and

everybody is saying, 'We need to be weaning ourselves off fossil fuels.' HFO has become a dirty word, so many are asking: 'What are the alternatives?'"

The alternatives, unfortunately, are currently pretty limited, especially for heavier, long-haul vessels. The focus has been on hydrogen-fuelled ships which are held by many as the great hope for the marine industry, however, commercially viable systems to produce sufficient hydrogen using 'low carbon' technology remain perhaps a decade away. The challenges of shipping are further exacerbated by the lack of options that can be retrofitted onto existing vessels, a huge issue given major cargo ships typically operate on a 25-year life cycle. That has left the industry to experiment with smaller vessels powered by one of two systems: diesel electric boats and fully electric ships. While both approaches are viable they are still experimental and considered to be more expensive than traditional shipping and hampered by limited range and capacity. Diesel electric vessels, which use diesel (or some other 'low carbon' synthetic fuel) to power a generator for the propulsion system, still also produce carbon emissions, albeit at a far lower rate.

Purely electric propulsion systems also bring additional complications in storing electricity. Lithium-ion batteries, despite substantive improvements in cost and efficiency, have their own safety concerns. Lithium-ion batteries can suffer from 'thermal runaway' when a fuel cell becomes damaged, starting a chain reaction among multiple cells. If that doesn't sound dramatic the kind of heat generated can melt aluminium and produce toxic fumes that can do huge damage to a vessel and the crew on board. Walters recalls a case he acted on in which a battery fire destroyed a large yacht in approximately 40 minutes, adding: "If you have a battery pack that explodes, it's to cause significant damage to the rest of the ship." Such fires, moreover, require specialist firefighting experience that may be beyond a crew's standard training. Earlier this year a fire on board a ferry heading to Sandefjord in Norway saw the vessel towed to nearby Tonsberg. Fears

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over toxic emissions saw the fire brigade advise residents to avoid the local areas for several days. While industrial sites using large batteries can solve many safety problems by locating cells away from people, shipping forces batteries into close proximity with the crew, not to mention bringing additional humidity problems.

Walters notes that battery accidents, while rare, highlight that “you can have green vessels that are operating in a very efficient way but when something goes wrong you can have significant problems with the potential for damage to the environment, people and property.” Batteries also bring additional complications with insurance, with Walters saying ship owners who carry equipment that rely upon large battery packs may want to review their policies to check that there is cover. “With some large claims now being attributed to Lithium-ion batteries, underwriters may argue that this requires notification by the policyholder to ensure that there has been a fair presentation of risk.”

Given such drawbacks and current limits on electric vessels, the industry has been looking for practical interim options for heavier ships. The shift to LSF and use of ‘scrubbers’ to remove pollutants from exhaust also have obvious limitations, not least, LSF’s controversial record on carbon emissions. Others see the use of less polluting fuels like liquefied natural gas (LNG) as a viable solution, with Total in March announcing a deal with MSC Cruises to supply 45,000 tonnes a year of LNG to the firm’s new generation of ships. But while LNG achieves huge cuts to sulphur and particle pollution, it still has substantial greenhouse gas emissions. As such, LNG at best appears to be an interim solution as the industry is pressed into adopting zero emission alternatives. Given the lengthy lifecycle of vessels, many ship owners will be inclined to hold out until fully green fuels become available.

### **The Erika moment**

Despite major advances in biofuels over the last five years, many are banking on green hydrogen or ammonia as the long-term solution amid expectations that high production costs will plunge as investment continues to pour into the sector, as with solar power. As a low-density fuel, hydrogen is likely to be first adopted for smaller vessels before being applied to larger ships.

“Hydrogen and shipping, I think it’s going to happen but God knows when and all the risk lies with the ship owners because nobody else is willing to take that,” notes IJGlobal editorial director Angus Leslie Melville, a veteran observer of clean energy projects. “Everybody wants

clean shipping, nobody wants to pay for it. Nobody wants to expose themselves to that massive risk.”

While scepticism remains over which technologies will carry the day, Walters notes the long-term push to green propulsion systems will also be a major step towards ushering in autonomous vessels, as zero emissions power systems will themselves be largely computerised. “So much of the machinery on board a ship is computer controlled today that it makes the transition to fully automated navigation systems inevitable in the future.” This transition is already well underway which may require a major shake-up in the regulation of shipping. The International Maritime Organization (IMO) is currently going through a scoping exercise to assess how shipping conventions would work when autonomous vessels or Marine Autonomous Surface Ships (MASS) become integrated into commercial shipping.

Ultimately, with such large shifts looming in a global industry, Walters concludes that a lot more state intervention will be required to get the shipping community, traditionally perceived as one of the less image-conscious sectors, to make the investments required to become ‘low carbon’ or even ‘no carbon’. Likening the shift to the pressure on shipping to phase out single-hulled tankers after a wave of environmental disasters in the 80s and 90s, he reflects: “You need a similar push and regulatory regime to force owners to start thinking about integrating cleaner technology into their ordinary services. It’s not going to happen overnight, it will probably take five-to-10 years to phase through.” Citing the 1999 disaster that released thousands of tonnes of oil off the coast of France, Walters adds: “It may need an Erika moment to get people to switch.”

While the IMO is seen by many to have dragged its feet on environmental standards, state actors, particularly the EU, look certain to accelerate change in the area through the decade. Larger blue-chip shipping firms like Danish giant Maersk are already investing significant sums in greener propulsion. “It’s the middle section of the industry who are wavering,” says Walters. “The average owner with a single ship that’s 15 years old is not going to suddenly say: ‘I’ll scrap that and spend several extra million to buy a new one because it’s greener.’”

Wavering or not, the next five years look certain to be the period in which the environmental agenda finally washes up for shipping, with the industry sure to face pressure on multiple fronts. After years of delay, green shipping has moved from if to when.

For more information, please contact;

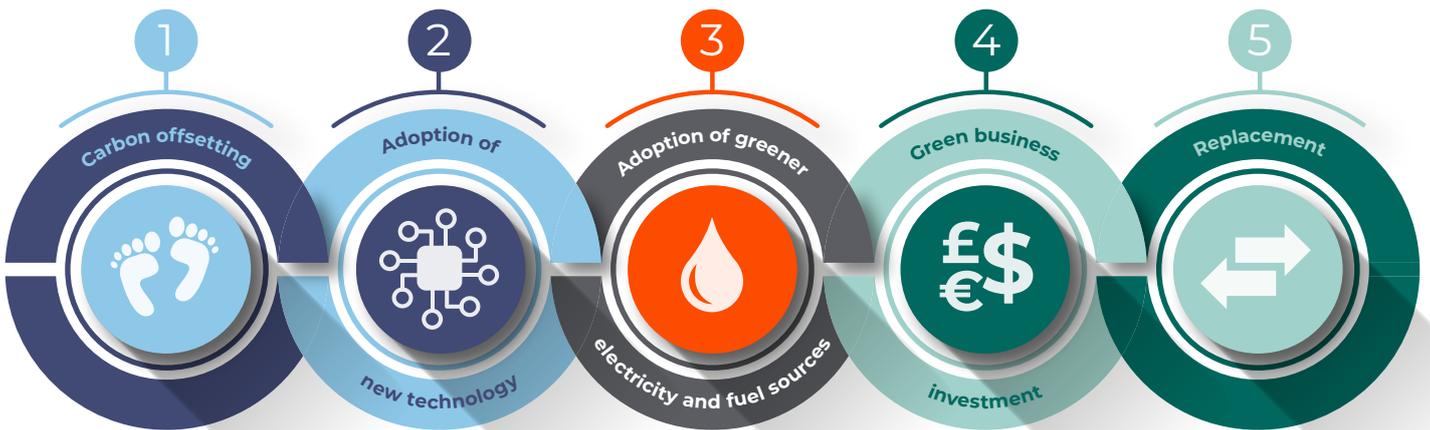


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