

Quality – wherever the work takes us

by Matteo Di Maio, Co-founder and Director, Bluestone Group

As shipping faces the twin pressures of decarbonisation and maintaining commerciality, retrofit strategies are becoming a defining factor in competitiveness. Regulatory frameworks such as FuelEU Maritime and the EU Emissions Trading System have set hard deadlines for emissions reduction, yet many operators are struggling to align compliance requirements with operational realities.

The challenge is not just one of technology, but timing. Lloyd's Register has estimated that global shipyard capacity can currently handle around 465 retrofits a year, compared with a projected demand of over 1,000. Further modelling from ABS and MSI suggests that even under moderate growth scenarios, capacity shortfalls will emerge before 2030, while Drewry's market outlook points to a sharp rise in repair-yard days as retrofit activity accelerates. Together, these findings highlight a systemic capacity gap that will only intensify as regulatory deadlines approach.

For operators of high-demand assets (such as cruise ships, offshore support vessels, and cable- and pipe-layers), lengthy yard stays are not only commercially costly but often incompatible with normal operational schedules. This constraint is forcing operators to rethink the way they approach retrofit execution. Retrofitting can no longer be treated as a periodic, one-off intervention; rather, it must be embedded into operational strategy, delivered with minimal disruption, and closely planned across the life-cycle of the vessel.

Finding the right rhythm

The traditional shipyard-centric model is showing its limitations. Extended yard stays tie up capacity, increase the risk of non-compliance, and impose substantial opportunity costs from lost trading days. In contrast, on-voyage or in-port retrofits, supported by meticulous pre-engineering, prefabrication, and supply chain planning, enable upgrades to be carried out in parallel with operations.

This approach has already proven effective. Over the past few years, Bluestone has executed more than 1,000 retrofit projects globally. One example is the replacement of air-conditioning chillers on large cruise ships. These systems are among the most energy-intensive consumers on board, second only to propulsion. By replacing

outdated chillers with modern units driven by frequency converters, electrical consumption is dramatically reduced. On vessels where each HVAC unit can weigh up to 45 tonnes, we have developed methods to replace units in less than 72 hours – a critical capability when off-hire translates directly into lost passenger revenue.

Air lubrication systems are also in high demand. By creating a carpet of bubbles along the hull, these systems reduce friction and can deliver fuel savings of up to 10%. For a major cruise operator, Bluestone installed compressors, piping, and on-board cabling while vessels remained operational, leaving only final external works to be completed during a short dry-dock visit. The programme spanned Italy, Singapore, and the Netherlands, involving 21,000+ worker-hours and 8,000 metres of cabling.

Advanced wastewater treatment has been another major area of activity. On a cruise ship of 113,000 gross tonnage, we converted freshwater tanks into bioreactors, installed 1,400 metres of piping and 9,000 metres of cabling – all within a confined, operating engine room. The team worked aboard for six months, maximising the scope of work completed in service to reduce time spent in yard to finalise integration.

Each of these projects demonstrates that with the right preparation, large-scale upgrades can be completed without prolonged downtime. The lesson is clear: retrofitting is no longer about waiting for the next dry-docking slot but about integrating technical upgrades into the operational rhythm of the vessel.

Working like a ghost

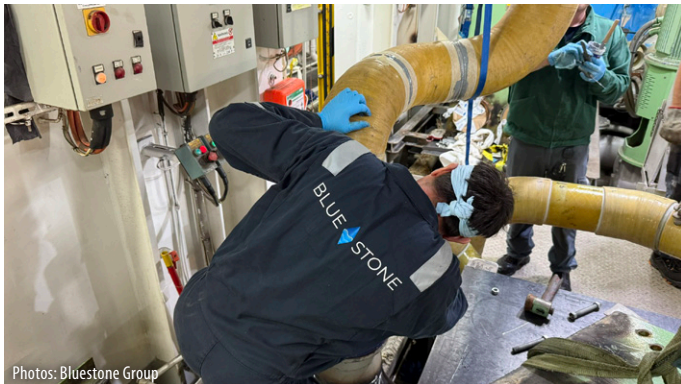
Environmental deadlines compress timeframes even further. Retrofitting for efficiency, emissions reduction, or fuel readiness is no longer optional – it is a regulatory obligation. Owners who delay risk not only

higher fuel costs and lost charter opportunities but also penalties for non-compliance.

The complication is that many retrofits require multi-system integration across electrical, piping, structural, and automation disciplines – often in parallel. Without rigorous planning and coordination, a project that should take days can quickly extend into weeks. Dry-dock intervals are also shortening. Where major overhauls were once carried out every 4-5 years, many vessels, especially cruisers, are now visiting every 2-3 years, largely driven by rising passenger expectations and new technologies. This has created additional pressure to complete more work in less time, increasing the value of partners who can prepare thoroughly in advance and execute quickly when the opportunity arises.

For this reason, forward-looking operators are increasingly treating retrofits as part of a vessel's life-cycle strategy. This reduces compliance risk by anticipating requirements early, preserves revenue by minimising off-hire, and ensures global consistency across fleets. A quality delivery model must ensure the same engineering standards are applied wherever a vessel is operating, which is becoming essential as operators manage fleets that span multiple regions. This consistency is achieved at Bluestone through centralised front-end engineering, a vetted global supply chain, and the deployment of our own multidisciplinary teams under the oversight of dedicated project managers. The result is the same technical precision, safety discipline, and reporting quality wherever the work takes us.

Life-cycle alignment also means scheduling retrofits around natural operational pauses. For passenger ships, cabin availability must be carefully managed to avoid lost revenue. For offshore assets, work is often integrated with project schedules. Enter ghost mode, an operational approach that minimises disruption, respects on-board protocols, and leaves



Photos: Bluestone Group

spaces clean and ready for immediate use. In this way, retrofitting is not just about installing technology but about preserving uptime, ensuring safety, and keeping assets competitive throughout their service life.

Retrofit challenges – both technical and logistical

The growing complexity of retrofit execution is clear from recent projects. On a pipe-layer vessel in the offshore industry, we delivered a complex electrical installation that involved pulling and installing both medium- and low-voltage power systems, integrating switchboards and automation interfaces – with commissioning under pandemic restrictions. The work had to be carried out in confined spaces, at height, and in coordination with other maintenance activities running in parallel. Despite these challenges, the project was delivered on time and on budget. This example underlines the fact that retrofit execution now requires as much project management and safety planning as engineering skill.

Other projects highlight a similar trend. On a Princess Cruises vessel, cooling pumps critical to ship function were replaced during active operations with

only a two-hour window available. The upgrade required coordination across the electrical, piping, and steelwork disciplines, leaving no margin for error. Meanwhile, a fleet-wide decarbonisation programme with Corsica Linea involved propeller reblading, hull modifications, coatings, and exhaust system upgrades across multiple ferries. Bluestone supported projects in France, Tunisia, and Türkiye, ensuring consistent execution and continuity across regions. The outcome was improved efficiency and environmental performance across the fleet, showing the value of a single trusted partner when multiple vessels require complex upgrades.

Together, these cases underline that retrofit challenges are both technical and logistical. Success depends on robust planning, coordination across disciplines and geographies, and the ability to adapt quickly when schedules shift or unexpected issues arise.

At sea, at speed, at scale

The retrofit pipeline will only intensify. Upcoming fuel-readiness retrofits for methanol, ammonia, and hybridisation are already more complex than current projects, requiring precise multidisciplinary integration and execution capacity at a global scale.

Digital tools will help manage this complexity, supporting simulation, pre-fabrication, and real-time reporting – but technical know-how and hands-on experience remain vital. Owners need partners who can not only install equipment but also model return on investment, anticipate supply chain risks, and deliver consistent outcomes across diverse fleets.

In an environment defined by regulatory pressure, scarce yard space, and unrelenting commercial schedules, retrofits can no longer be delayed until conditions are convenient. They must be delivered at sea, at speed, and at scale. ■

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The Bluestone Group is a global provider of technical services to the maritime and offshore energy sectors. Specialising in retrofits, newbuildings, and life-cycle asset management, the company delivers engineering-led solutions that combine sustainability, operational continuity, and digital innovation – including on-voyage interventions and minimal off-hire clean-tech integrations. Go to bluestone-group.com/service/retrofits to learn more.