Adversity or opportunity?

Alexandra Veroude and **Emma Zomer** of STX Commodities looks at how shipping companies can navigate maritime regulatory changes to develop a robust decarbonisation plan

The marine industry is increasing in complexity. Long-standing challenges, such as geopolitics, global demand and trade frictions, are all presenting as headwinds at a time when the regulatory landscape is also becoming more demanding. Navigating these additional layers of regulation requires operational change and a contemporary set of understandings – how prepared are we?

The International Maritime Organization (IMO) has set the goal of net zero emissions by 2050, with a 20% reduction sub-target by 2030 and 70% by 2040. It requires vessels to obtain certification for energy efficiency and carbon intensity, as measures to support the decarbonisation goals. The IMO is discussing a package of additional policies that will add greater weight behind the industry delivering the targeted result. A decision is expected by spring 2025.

SWITCH FUELS OR PAY, SAYS EUROPE

Europe is leading the charge to force change and has set its maritime decarbonisation strategy into regulation. The EU Emissions Trading System (ETS) was expanded to include the maritime sector in 2024 and an annual GHG reduction regulation, FuelEU Maritime (FEUM), will come into force in 2025.

The EU has revised its Renewable Energy Directive in order to reach its ambitious climate goals, targeting net-zero emissions by 2050. 'RED III' entered into force in 2023; the targets were adjusted upwards and the scope was extended to cover all transport sectors, including shipping. Member States can now choose to introduce either a 14.5% reduction of GHG intensity in transport or ensuring that renewables comprise of at least 29% of the energy supplied within in the transport sector by 2030. A specific maritime target for renewable fuels of non-biological origin (RFNBOs) was introduced, stating that RFNBOs must equal 1.2% of the total energy in the maritime sector in EU states that have maritime ports.

These regulations are among the necessary steps required to force change. However, the lack of a globally consistent framework complicates reporting requirements, and minimising the associated costs requires planning and innovation.

Reducing the greenhouse gas emissions of ships moving through EU waters is the goal of FuelEU Maritime (FEUM). The regulation sets ambitious targets and imposes penalties for non-compliance. The regulation is serious about creating change, with the penalty significantly higher than the costs associated with various alternative fuels.

The penalty under FuelEU is set at €2,400/tonne of VLSFO eqv, or around €640/tonne CO_2eq. This means that a shipowner must pay around €640 for each tonne of CO_2 emitted above the FuelEU benchmark. In contrast, the cost of saving a tonne of CO_2 with low carbon marine fuels is less than this amount. It makes economic sense to consider renewable fuels.

Blending in the correct share of alternative fuels (varying depending on the carbon reduction intensity of each fuel) will avoid paying the penalty.

PRICE UNCERTAINTY AND FEEDSTOCK COMPETITION

Many fleets are now equipped with dual-fuel engines, allowing these vessels to switch between marine fuels: conventional and low-carbon based on market conditions. This flexibility aids in cost management, shielding against isolated price volatility and minimising the costs associated with regulations.

The prices of alternative fuels, much like the traditional ones, are volatile. While geopolitics and global demand will trigger swings in the prices of conventional fuels, regulation is often behind the ups and downs of renewable fuels.

The ever-changing regulatory framework makes it challenging to forecast low-carbon fuel prices. Moreover, many feedstocks and e-fuels have applications to other sectors, such as road and aviation. Shipping is competing rather than working in collaboration for access to green fuels.

FuelEU maritime multipliers (used to attract take-up) are mostly limited to RFNBOs but

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are used more liberally in some road markets. This makes it more challenging for maritime to compete if supply is constrained. The aviation industry is facing similar challenges and in July, Air New Zealand dropped its 2030 net zero goal blaming the availability (or lack thereof) of sustainable aviation fuel.

With global trade so heavily reliant on shipping, industry needs to ensure that lower-carbon fuels can be supplied at a sustainable price for the volumes required.

STRATEGIC OPPORTUNITIES FOR MARITIME COMPANIES

To achieve optimal economic outcomes, maritime companies should adopt an integrated approach, combining fuel cost management and regulations.

Under FEUM, manure-based biomethane fuels (such as bio-LNG) can be an effective compliance option. This is a result of the well-to-wake (WtW) lifecycle approach to calculating emissions, which allows the full value of a negative emission factor to be captured.

However, it is not that simple; each piece of regulation is calculated differently. The ETS calculates emissions on a Tank-to-Wake (TtW) basis, meaning that an optimal solution under ETS may at times be at odds with minimising FuelEU maritime costs.

Maritime companies should also explore opportunities to monetise green premiums, so that costs can be attributed along the supply chain or more broadly across the industry, via insetting or pooling. These measures can support economies of scale principles and greater market efficiencies.

A maritime inset would provide an opportunity for a shipowner to assist an entire value-chain in reducing its Scope 3 emissions and receive compensation for the green premium of the fuel.

Meanwhile, pooling under the FEUM regulation refers to the ability for a vessel with excess emission reductions to match with numerous other vessels such that the weighted average emission sum is below the FuelEU benchmark. Accessing pools requires bespoke annual arrangements that can provide an economical solution for all parties.

Pooling arrangements also allow greater time to assess the progress of emerging technologies. Predicting the scalability of emerging technologies is always challenging, particularly when outlays are significant. DNV's 2024 edition of the *Maritime Forecast to 2050* models scenarios that simulate decarbonisation at 2050. Interestingly, in all scenarios no single fuel or technology dominates at 2050 and the DNV highlighted that outcomes were particularly sensitive to input assumptions.

The complexity of the FEUM regulation alone requires specialist expertise. Yet, an integrated approach is needed to ensure that no aspect is considered in isolation and be ready to act as the regulation changes.

Each fleet has a different composition – vessels, engines, ports of call, cargo, utilisation, personnel – requiring a bespoke solution to meet compliance requirements and internal targets. However, at an aggregate level, these trends are emerging as the most likely to steer the marine industry through the noisy, yet necessary, path towards decarbonisation:

1. Biofuels and bio-LNG will likely be the most widely adopted alternative fuels in the upcoming three to five years. These 'drop-in' fuels require minimal operational adjustments to use in existing engines. However, using bio-LNG requires LNG capable vessels and bunkering at specific locations. As such, for many fleets, biofuel blending will be the best option.
2. Shifting from biofuels toward RFNBOs is expected as the end of the decade approaches. The FEUM regulation contains a 2X multiplier for the use of RFNBOs in shipping. These products are still in the initial stages of production and prices are elevated. However, as technologies advance and greater scale is achieved, the multiplier will be an effective tool to incentivise bunkering as well as the RED III mandates. Production capacity is in development, but vessels could begin piloting RFNBO fuels at a greater scale within the next few years. eLNG is operationally identical to fossil LNG bunkering and eMethanol is operationally less difficult than its counterpart, while toxicity concerns surround eAmmonia.
3. Ammonia is mostly used today for chemical purposes, meaning that some tankage is available for pilot bunkering. However, scalability will be dependent on a significant expansion of the associated infrastructure. The energy density of ammonia (and methanol) is approximately half of VLSFO or HFO. As such, twice the tankage capacity is required to deliver the same volume of energy. In contrast, biofuels and LNG can be brought to market through currently available fuel infrastructure and only minor adjustments are required for methanol.

The journey towards maritime decarbonisation is complex. Various overlapping schemes lead to constant fluctuations in optimal solutions and the answer varies depending on the part of the value chain you sit in. Yet the cost of inaction is substantial.

By integrating fuel costs, EU ETS, FuelEUM and additional monetisation strategies, maritime companies can formulate a robust decarbonisation plan. STX Group invites maritime companies to explore decarbonisation solutions with us. Our expertise in navigating regulatory requirements and optimising fuel strategies can support you in achieving sustainability objectives.

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