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Finding the best training strategies for SIRE 2.0

Tanker companies have a big challenge finding the right approach to online training, finding the best training for SIRE 2.0 inspection and in behavioural competency. We spoke to OTG's Raal Harris

With the change in approach of SIRE 2.0, increasing regulatory complexity and charterers requirements, tanker companies face a challenge working out effective training strategies with which to best prepare their crew. Whilst technology provides flexible and cost-effective options, there is increasing recognition that online training, while often cheaper, is not always better.

In the latest (Q4 2024) issue of the Seafarer Happiness Index, there were complaints from seafarers that they found online training they were asked to complete "insufficiently engaging."

Seafarers said they were asked to complete the same courses repeatedly without gaining new insights and complained that online training was disrupting their rest and family time.

However, alternative perspectives on online training were shared in earlier surveys. There were comments in the Q1 2024 report that "seafarers appreciate regular, well-organised, and comprehensive training" which did not cut into vacation time, and in Q4 2023 there were requests for "more realistic, online, and efficient training methods."

These are all issues which maritime e-learning leader Ocean Technologies Group, now part of Lloyd's Register, is helping companies tackle.

Explaining the reasons

It is important that shipping companies make clear to people why they benefit from the training they are being asked to do, says Raal Harris, chief creative officer of Ocean Technologies Group (OTG) and LR OneOcean.

For example, the company should explain that by taking the course, the seafarer will gain specific proficiencies, leading to being able to take on a new role. Or that they are being asked to do a course because a specific risk or opportunity has been observed, and the training is designed to help them with that.

"It is amazing how many companies get it wrong, you get an email from HR or head office saying, 'you've got to do this training,' with no explanation of the benefit to either the individual or the company," Mr Harris said.

Versions of online training

Bear in mind that online training can mean many different things, from synchronous virtual classroom teaching to asynchronous online courses involving varying degrees of sophistication.

The biggest question is the quality of the training, not whether or not it is delivered online, he said. Just as it is with face-to-face training. "There is a perception that face-to-face training is more interactive, but I have been in classrooms where there has been no interaction, someone talking and everyone is asleep."

Moving courses online can be cheaper for companies to provide, and easier to scale to larger audiences and many have jumped to using video conferences and virtual classrooms as a cost-effective solution. But if you have too many people on an online course at once, and "you don't have people who understand how to use the online format well [such as] with polls, you are not creating a good quality experience," he said.

"There are things about delivery online that are different, which you've got to think about very carefully."

In some areas, online training isn't the complete solution. For example, "I would never say to anybody. 'Do all your soft skills training

Raal Harris, chief creative officer of Ocean Technologies Group (OTG) and LR OneOcean

online,'" Mr Harris said. "You need to utilise role play and encourage feedback as you would face to face. But e-learning can help to prime those activities with underpinning knowledge as part of a blended approach."

Online training lends itself to theoretical learning that can help along the learning journey setting context, explaining concepts, processes and procedures or functions on a piece of equipment.

This can be provided online, alongside hands on training. But at some point someone will want to train on the actual equipment.

SIRE 2.0

Mr Harris is a big enthusiast of SIRE 2.0, in particular how it is pushing tanker companies to pay more attention to human factors issues.

SIRE 2.0 has been "an incredible achievement from OCIMF," he says. "First their vision and ambition to do it, and [then] to roll it out in the way they have. They

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have applied a huge amount of emotional intelligence to the process. They've focussed on the right things - they haven't just dumped it on people but have brought them on the journey"

SIRE 2.0 sits alongside a broader trend of charterers wanting to know more about ship operators and their safety standards, their operational performance, and how they treat their seafarers.

But the shift to human factors-based inspection in SIRE 2.0 means that operators must place greater emphasis on crew competency, decision-making, communication and operational behaviour rather than just equipment, procedures and compliance. This means companies have an additional incentive to support their crew's development of a range of technical and non-technical soft skills, he says.

Many companies asked crew to take training on "Performance Influencing Factors" (PIF), so they would better understand human factors that may enhance or diminish performance in the inspection.

Behavioural competency

There is a growing realisation among tanker companies that one of the seafarer skills which is most vital is what is known as behavioural competency, defined as 'skills, behaviours, and attitudes an employee needs to excel in their role.'

To manage and measure these requires a means of assessing them, and this is very difficult because it is subjective.

To help, INTERTANKO and OCIMF developed the Behavioural Competency Assessment and Verification (BCAV) framework. It discusses the importance of building a company culture where people are supported in developing competencies. The competency management process also encourages crew members to have "the right kind of dialogue, reflecting on performance and agreeing areas that can be developed further."

But it still means that the assessor needs to make many judgements and observations, something they may not be used to doing, Mr Harris says. And formal appraisals can be harder in a ship than in an office. On a ship, you have to live and work with that person 24/7.

To avoid the stress on both sides, "people do shy away from difficult conversations and there can be a temptation to give very vanilla statements."

Behavioural competency is best judged in the context of a real or simulated exercise, rather than asking people to role-play how they would act in a certain situation. In this real exercise, people are deploying both their 'soft' (or human) skills and technical skills, Mr Harris says.

Competency management provides a framework for this more sophisticated approach and can include a blend of e-learning, and face to face activity, and a means of managing the proficiency.

Behavioural assessments also typically look at the communications seafarers are having between each other, which means that command of English is a factor.

Competency management systems

Tanker companies are increasingly developing competency management systems, covering multiple "proficiencies" they would like people in different roles to have or to develop as they progress their careers.

"Proficiencies" can be both behavioural and technical.

A seafarer may be assessed on both technical and behavioural competencies at once, for example by doing a real mooring exercise.

A company's competency management system can involve multiple competency standards. Different companies put it together in different ways. For example, the SIGTTO competency standards for operating gas tankers is a book of detailed rank-based proficiencies, Mr Harris says.

"You've got to have the support of people that really understand these standards," Mr Harris says. "It is not easy, but it is the right way of doing it. The secret is in starting small on the core competencies you want to track and build from there."

Soft skills

Along with a greater interest in behaviour competency, OTG is seeing growing usage in its soft skills training courses.

Tanker companies are seeing that soft skills make a direct contribution to operational performance, Mr Harris says.

Topics covered under soft skills include leadership, bullying and harassment, communication, managing fatigue and stress, managing crew welfare.

The training can be done onboard or online before seafarers go onboard.

It is part of a trend of companies increasingly paying attention to cultural dimensions of their businesses, the values, the mission, what is being communicated to people.

"I think there's a lot further to go in that one, I'm looking to see if that's a trend that emerges," he says.

20 years ago, OTG (then known as VideoTel) produced a leadership and management course covering many soft skills, and despite great feedback it was not a commercial success. Although people recognised the importance of soft skills at the time, they were not prioritising them, Mr Harris said. Now, things have changed.

Seafarer pre-voyage testing

There is a growing trend for companies to test seafarers with online tools before accepting them to work on a ship. OTG has long offered services here, with an online Crew Evaluation System (CES) designed to test their technical knowledge and ability profiling which together "reveal the strengths and weaknesses of any given candidate," Mr Harris says.

Companies are also increasingly considering maritime English language testing, to ensure people are able to understand written materials and verbal instructions needed to work safely onboard.

Companies sometimes do personality profiling for the top four seafarers onboard. This is not a test, because there is not a right or wrong answer, but can help the company understand the candidate and the potential dynamics between their team members. It can also help the individual to understand themselves better, know where the 'rough edges' of their personality might be, so they may be able to mitigate them.

Returns on investment

Good training requires investment and companies want to see evidence that the spending they make gives them returns. As a provider, OTG would also like to demonstrate this to potential customers.

Inspection 'observations' is one way companies can evaluate the performance of their crew. Whilst inspection performance is not the only metric that should be used to evaluate a vessel or a company, it may be the best metric available to us, Mr Harris says.

It has been possible to demonstrate from inspection data that there is a correlation between inspection and training performance and companies typically get more inspection observations on areas where they appear to do less training.

OTG was acquired by Lloyd's Register in 2024, joining its "OneOcean" portfolio of digital services. OneOcean has other software tools which can provide metrics about vessel performance. OTG would like to see this data tied together with data about the training the company has done, so companies can see where they are getting the most returns on training investment.

"It gives us a huge amount of data we can put together to explore the connection between human, vessel and voyage performance," he says.

How Nigeria's Dangote refinery will change tanker demand

The Dangote Refinery near the Port of Lagos is set to reshape tanker demand in West Africa, with demand for product tankers set to grow and high-quality refined products to become more widespread

By Navigate PR on behalf of GAC Nigeria

As refinery capacity in Nigeria ramps up in 2025, the country looks set to boost its standing as a serious player on the global oil stage.

Many are preparing for a likely redistribution of tanker demand in West Africa, with product tankers increasingly being sought over crude carriers.

The Dangote Refinery near Lagos, in particular, promises to present important opportunity for Nigeria's economy and potentially reshape the global tanker market and its routes.

Historically, Nigeria has been ranked among the world's leading crude oil exporters, tapping into vast natural resources which have yet to be fully explored and exploited.

It became the first sub-Saharan African nation to join the Organization of Petroleum Exporting Countries (OPEC) in 1971. Today, it remains Africa's largest oil producer and ranks 11th worldwide. As home to 222 million people, it is the group's most populous member.

According to the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) 2023 annual report, the country had nearly 37 billion barrels of reserves for oil and condensate in January 2024.

But plentiful resources alone are not enough. Despite its mineral riches, Nigeria had to import refined products, due to a lack of facilities with the capacity to meet domestic demand.

Dangote refinery

More than a decade after its inception and at a cost of nearly $20 billion, Dangote Refinery is expected to change the balance.

Since starting operations in January 2024, it has transformed Nigeria into a net exporter of jet fuel, naphtha and fuel oil. Projections suggest the country could export 50,000 barrels per day (bpd) more gasoil than it imports in 2025, with volumes expected to triple by 2026.

Once fully operational, the refinery will have a maximum capacity of 650,000 bpd and is expected to reduce Nigeria's demand for refined products.

According to a report in Financial Nigeria, the President of the Dangote Group has stated that the refinery went through 'effortful' environmental approval processes under the Ministry of Environment.

The company is reported to comply with World Bank and European Union emission standards.

In 2017, the refinery procured a range of equipment from Elessent Clean Technologies (formally known as DuPont Clean Technologies) to minimise its environmental impact.

More refined exports

Nigeria's gasoline and diesel can now be locally sourced through Dangote Refinery rather than imported from other continents, predominantly Europe and America.

"Before Dangote, Nigeria had to rely on significant levels of imported refined oil products," says Johan Thuresson, Managing Director of GAC Nigeria.

"But now, the country is set to become a significant exporter of refined products such as clean petroleum and fuel oil. That will boost its role in the global tanker market, it will energise West Africa's tanker trade and create new opportunities for wider logistics and transportation services.

"It will reshape the competitive dynamics of West Africa's oil market with neighbouring countries likely to change their import strategies in response to Nigeria's increased refining capacity. That will bring a shift in the

region's trade flows and tanker deployment."

Imports

Imports of crude oil from the United States for use in the Dangote Refinery are expected to increase. During the first half of 2024, the Nigerian National Petroleum Corporation - which was to supply half the refinery's crude oil requirements - only delivered about one-third of the anticipated volumes.

Despite regulatory efforts to promote local supplies, Dangote has had to look overseas to secure additional crude oil volumes.

"When the refinery was first envisaged, the Nigerian government intended to use domestic crude oil to promote local energy security," Mr Thuresson says. "But that has now changed, boosting imports directly from the United States."

"Right now, US crude is much cheaper than its higher quality Nigerian equivalent. The country is now exporting its own crude direct to markets and using cheaper alternatives from overseas at the Dangote Refinery."

"As a result, the overall tanker market in Nigeria will be much busier, providing a major boost for the local economy and those involved in the sector."

Overall outlook

Once the Dangote Refinery is at full capacity, the overall outlook for Nigeria's tanker market is likely to be mixed. With Nigeria reducing its crude oil exports, demand for VLCC and Suezmax vessels is likely to drop for long-haul voyages.

But on the other hand, more refined product exports will increase call in the region for medium and low range tankers, with new refined product trade routes emerging between Nigeria and Europe, South America and the rest of Africa.

"Changes in oil flows are likely to shore up competition for shipping services in Nigeria and West Africa," says Mr Thuresson.

Aging tanker infrastructure

The positive outlook for Nigeria's oil and tanker markets could be challenged by ongoing maintenance issues with related infrastructure that could limit the potential for additional refined product exports.

"Aging pipelines, jetties, and equipment – some of which have been out of operation for months due to repairs – led to a decline in oil exports in 2024," says Mr Thuresson.

"Maintenance delays and the lack of consistent upkeep have halved production capacity in some areas, creating uncertainty about the timeline for full restoration."

"Pipeline and storage upgrades will be critical to ensuring the long-term success of Dangote Refinery."

However, "economic growth is forecast to improve as refining operations stabilise and improve, prompting greater foreign investment in infrastructure and trade logistics," he says.

TO

Tanker trends in IDWAL's March 2025 "Snapshot"

Ship inspection and survey company IDWAL reports that the average grade for tankers inspected over Sept 2024-Feb 2025 was 76, the highest was 91 and the lowest was 46.

For all vessels, the best scoring was 94 and the worst scoring 34.

For tankers under 5 years old, VLCCs had an average grade of 91; Suezmax, 80.7; LR2/Aframax, 88.6; Handysize / MR, 78.4 and small tankers, 80.1.

For tankers over 20 years old, VLCCs had an average grade of 72.8; Suezmax, 73.8; LR2/ Aframax, 69; LR1/Panamax, 75.3; Handysize/ MR, 71.0; small tankers, 63.3.

The biggest changes over the 6 month period was seen in Handysize / MR under 5 years old, whose grades declined by 9.1 per cent, and LR2/ Aframax over 20 years old, which declined 7.2 per cent. The biggest improvement was in LR1/ Panamax age 10-15 years, which improved 1.8 per cent.

39.1 per cent of tankers inspected were built in South Korea; 26.9 per cent were built in China and 24.4 per cent were built in Japan. 3 per cent were built in Turkey and 2.2 per cent were built in Croatia.

Idwal gives a grade to every vessel it inspects. The inspectors follow a standardised inspection process, capturing over 500 data points, which are used to calculate the grade, on a scale 1 to 100.

TO

Baltic Exchange offering chemical tanker pricing data

The Baltic Exchange has launched chemical tanker freight price assessments, covering shipments of chemical and agricultural oils

Written by Navigate PR on behalf of the Baltic Exchange

The Baltic Exchange has launched chemical tanker freight price assessments, covering shipments of chemical and agricultural oils, called BCAA (Baltic Chemical and Agricultural Oil Assessments).

They are designed to provide owners, charterers, brokers, and traders with accurate, independent freight pricing data to help them navigate a complex and often volatile market.

The chemical tanker industry presents unique challenges, with cargoes that require specialised handling and stowage.

Unlike the crude and clean petroleum markets, where freight benchmarks are well-established, chemical and agri-oil shipping has lacked consistent, independent price assessments.

Historically, freight pricing for chemicals has been negotiated with limited visibility on rate trends and market fluctuations.

The BCAA aims to fill this gap by offering pricing data based on specific shipment sizes, creating a clear reference point for market participants.

By focusing on high traffic shipping corridors, including the US Gulf, the Far East, the Middle East Gulf and Northwest Europe, the BCAA is designed to reflect the maturing nature of the chartering market for parcel tankers. It will also offer valuable insights into global chemical carrier price movements.

New requirements for pricing data

Chemical tanker freight rates are increasingly influenced by a range of global factors. Regulatory changes, alternative fuels, and shifting trade flows are reshaping the market.

For instance, as methanol gains traction as a marine fuel, the need for precise freight assessments grows.

The maritime industry is also under pressure to comply with emissions reduction targets, which has led to increased investment in low-carbon alternatives.

Governments worldwide are pushing for biofuel adoption, altering demand patterns and increasing the need for reliable cost benchmarks for tankers critical to transporting these alternative fuel options.

"The cargoes that chemical tankers transport are becoming more complex each year," says Paul Mazzarulli, Head of Baltic Exchange Americas. "With regulatory shifts and evolving fuel markets, reliable freight data is essential for informed decision making."

The industry's transformation is not limited to cargo types. Trade disruptions, such as those caused by conflicts in the Red Sea and Ukraine, and last year's drought in Panama, have forced shipowners to reroute vessels, leading to higher fuel, insurance, and operational costs.

Extended transit times and increased security risks have further complicated freight rate calculations.

At the same time, expanding domestic chemical production in China and the Middle East, and the United States' focus on low-cost ethylene exports, are reshaping global supply chains.

As suppliers adjust to these changing trade dynamics, accurate freight data is more critical than ever to maintaining competitive market positioning.

Tanker market complexity

The tightening supply of chemical tankers is also adding to the sector's challenges. With an aging fleet and rising newbuild costs, shipowners and charterers are looking to optimise their operations carefully.

New environmental regulations, such as the International Maritime Organization's (IMO) Carbon Intensity Indicator (CII), are also influencing fleet renewal strategies. The rising cost of compliance with decarbonisation targets means that many older vessels are being phased out, reducing available tonnage in an already constrained market.

With the launch of the BCAA, owners can take a more data-driven approach to fleet management, helping them to assess freight trends and make strategic investment decisions.

By providing a standardised benchmark, these assessments enable operators to compare rates, identify cost-saving opportunities, and plan more effectively for fleet deployment.

"With methanol demand increasing, companies are scaling up production, developing new chemical products, and investing in alternative fuel technologies," Mr Mazzarulli says.

"Access to precise freight data supports better decision making in everything from vessel chartering to asset investments. That is why we launched the BCAA and work with key Baltic panellists in the sector to truly understand what is happening in the market."

Accuracy and integrity

Seven leading brokerage firms in the chemical tanker space contribute to the BCAA, ensuring its credibility and market relevance.

These panellists provide independent assessments based on real market transactions, ensuring that the data reflects actual trading conditions rather than theoretical estimates.

To maintain impartiality, Baltic Exchange does not assign specific rates to individual brokers, preserving the integrity of the assessments.

"[The] Baltic Exchange's reputation as a trusted provider of freight benchmarks is built on its commitment to transparency and accuracy," Mr Mazzarulli says.

"Market participants in the tanker space have relied on its assessments, not only for spot chartering decisions but also for long-term contract negotiations, risk management, and financial planning.

"The BCAA is our latest step to bring our renowned expertise and global perspective to a chemical tanker market that is becoming increasingly important and complex."

Further developments

While the current assessments are published weekly, the Baltic Exchange is exploring ways to expand coverage and refine reporting frequency of these chemical tanker assessments.

As market demand evolves, it will look for opportunities to provide more frequent updates or include additional vessel sizes and cargo types in the assessments.

"We're always evaluating whether to introduce new routes, adjust existing ones, or adapt to shifting trade patterns to ensure our benchmarks remain relevant," he says.

"We will see how the market evolves over the coming year to decide whether we increase the frequency or change the route network."

The Baltic Exchange is also looking to widen its engagement with market stakeholders to refine the BCAA methodology.

By working closely with owners, charterers, and brokers, the Baltic Exchange aims to ensure that its benchmarks remain aligned with industry needs and that the BCAA remains fit for purpose.

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- Legal Services

Fortescue, green ammonia and a converted service vessel

Australian mining giant Fortescue wants to convert its bulk carriers to green ammonia power, while also becoming a major green ammonia supplier. To demonstrate, it converted a service vessel to run on ammonia

Australian mining giant Fortescue wants to stop using fossil diesel in all of its mining and shipping operations by 2030. It sees the pathway forward being the use of green ammonia fuel (made by renewable electricity), and plans to become a major supplier itself.

To illustrate that ammonia fuel can work on ships, it converted a 75m industrial service vessel, now called "Green Pioneer", to run on a diesel-ammonia blend (up to 30 per cent ammonia).

Green Pioneer

The Green Pioneer has a 20 tonne C-type tank holding liquid ammonia on its deck.

It has four conventional Cummins four stroke diesel engines, two of which have been adapted to combust a diesel-ammonia blend of up to 30 per cent ammonia.

It is a diesel-electric vessel, so the engines are generating power for an electric motor to run the propulsion, rather than driving it directly.

The work to convert the engine to run on ammonia was done at Fortescue's land-based testing facility in Perth, Western Australia. It has also been trialled at a 50 per cent blend.

The vessel was converted to run on ammonia at the Seatrium yard in Singapore.

The first ammonia bunkering trial was done at an ammonia facility on Jurong Island, in the Port of Singapore in March 2024.

The vessel had bunkered with ammonia fuel twice by March 2025. It is using hydrogenated vegetable oil (HVO) instead of fossil diesel.

The vessel is managed by Anglo Eastern Ship Management.

The vessel does not have any new technology on it, Fortescue says, just known technology put together in new ways.

Safety of ammonia

Andrew Forrest, CEO of Fortescue, believes "ammonia is a perfectly safe shipping fuel."

"I'm very happy with the safety. I consider it new, not unsafe," he says.

Given a choice of conventional fuels or ammonia, "I'm not sure which one is worse [for safety]."

Gas will ignite with a match, but ammonia doesn't, he points out.

When crew connect the ammonia pipeline for bunkering, after making the connection they check it is gas tight using nitrogen. Then they leave the manifold and control the bunkering remotely from the bridge. The pipelines are all double walled.

The vessel is fitted with alarms and automatic shutdowns set to 30 ppm ammonia level. US regulatory (OSHA) guidelines state that exposure of 50 ppm over 8 hours is a permissible limit and 300ppm is immediately dangerous to health.

Flue from the engine is passed through a scrubber where nitrous oxides and any un-combusted ammonia can be washed out. Any purge gases can also be sent through this scrubber.

The vessel was provided with class and statutory certificates by DNV in April 2024. DNV has been involved in the project since 2021, when Fortescue engaged it to work on the feasibility study and ammonia notation for the vessel's conversion.

DNV's Technology Qualification process provided the framework for the qualification and assurance of the engine modifications, where industry rules were yet to be developed.

DNV's Gas Fuelled Ammonia notation set out the requirements for the ship's fuel system, fuel bunkering connection and piping through to the fuel consumers.

With no IMO regulations covering the specific use of ammonia, DNV and Fortescue used the SOLAS provision for Alternative Design Arrangements (ADA) with the backing of the Maritime and Port Authority of Singapore, particularly around fire and evacuation risks.

Green Pioneer industrial service vessel, which is capable of running on an ammonia fuel blend, arrives in London

Fortescue

Fortescue is one of the world's largest mining companies. CEO Andrew Forrest says that together with Rio Tinto, it ships more goods than any other company in the world by weight.

Fortescue's website says that each year the company loads 970 iron ore carriers from Port Hedland, Australia, with 190m tonnes shipped every year. It is a major supplier of iron ore to the Chinese steel industry.

Fortescue is a major developer of green hydrogen projects, made by renewable electricity.

It is involved in green hydrogen projects in Morocco, Michigan, Colorado, Arizona, Oman, Jordan, Egypt, Gladstone (Australia), Hemnes (Norway), Holmaneset (Norway), Pecem (Brazil) and Pampas (Argentina).

Green hydrogen and ammonia

Green ammonia is made from green hydrogen, which is made with renewable electricity. So its availability and cost is linked to the availability and cost of renewables. Mr Forrest believes that there is no need for concern about that.

"Our ability to make electrons is enormous. The scale is infinite - never running out," he says. "Technology is becoming better and better, and cheaper and cheaper."

"In 1 year, 3 years, we'll have this technology everywhere."

Mr Forrest is very sceptical that methane can be a transition fuel, since there are still large amounts of methane leaked to the atmosphere over the production and combustion chain. Calling it a transition fuel is "untrue, fake news," he says.

Mr Forrest is a strong proponent of IMO implementing a carbon tax and says that a tax of just $100 a tonne would make green ammonia fuel competitive with conventional fuels.

He thinks that IMO should not be set up to make agreements by consensus. "I can't even get my family to agree," he said.

The company is "very confident" that ammonia propulsion can be "put in a bulk carrier before the end of the decade.

The company chooses ammonia after asking the question, "where are the sources of fuel that can do more for me than greenwash," he says.

"Any fuel with carbon - organics, biofuel - you compete directly with food."

Asked when green ammonia will be available for shipping, Mr Forrest replies, "I am whipping my team every day. Give us a couple of years."

Asked for his view on Maersk orientating towards biofuels, he replies, "we love Maersk, [but] we are in a different position. Our customers say, 'we don't want anything killing the planet.' Maersk are slightly insulated from that pressure."

Forget offsets

Mr Forrest is very sceptical about the use of offsets in calculating carbon emissions. "Offsets don't work," he said.

A common estimate is that only 25 per cent of offsets are real, he says. So, using offsets is equivalent to relying on a medicine with only a 25 per cent chance of success.

"The world 'net' in 'net zero' has been dangerous," he says. It allows mining companies to avoid taking action. "'Net' means you will greenwash your way out. 'Net' means no change at all," he says.

Instead, Fortescue prefers the term "real zero". TO

Getting emissions data in shape for ETS and FuelEU

By OceanScore

Shipping companies are seeing their first EU emissions data being verified over the first half of 2025.

If verifiers determine discrepancies in the data, there could be increased costs. There may be disputes between stakeholders about who is paying them.

Meanwhile, the costs of buying EUAs is increasing and FuelEU Maritime adds another layer of complexity.

The best way to manage the risks is to get better transparency of the data, so you know about your emissions all the time, says Albrecht Grell, Managing Director of OceanScore.

Some tracking portals provided by verification companies fall short in several areas, he says.

Some systems do not recognise that the definition of "voyage" for commercial purposes may be different to the definition for MRV (monitoring, reporting and verification) purposes, which covers the period between one berthing and the next.

Albrecht Grell, managing director, OceanScore

The data may not include commercial and technical off-hires, when emissions costs are paid for by the shipowner.

So companies may not be accurately predicting their own emissions related costs.

In EU ETS, the shipowner is designated the responsible party but can delegate this role to the Document of Compliance (DOC) holder. This is typically the ship manager, or whoever is responsible for vessel safety under the ISM code.

In EU ETS, the costs of allowances for charter periods must be covered by the charterer in line with the 'polluter pays' principle.

However under FuelEU Maritime, the DOC holder is held solely responsible. The charterer only covers costs if that is agreed in the contract.

Spot market operations further complicate matters as compliance costs are often embedded in freight rates.

Standard accounting and reporting systems lack the capability to handle these complex inter-stakeholder relationships and compliance structures, OceanScore says.

Offhire emission data is typically not available from a verifier's report.

The data gets very complicated. EU ETS obligations are met by purchasing EUAs, whilst FuelEU Maritime obligations may be met by joining a pool.

There are exchange rates to consider, if the vessel is chartered in dollars but buys EUAs in Euros.

The burden of data generation from companies with large numbers of vessels, different operating models and multiple charterers with different clauses will quickly overwhelm Excel-based and other traditional tracking tools, Mr Grell says.

Instead, companies should adopt an Enterprise Resource Planning (ERP) type solution that integrates operational and financial transparency.

"In the initial phase, running a parallel system to existing accounting software may seem excessive," Mr Grell notes. "However, as the number of vessels to be monitored increases and regulations evolve, the benefits in efficiency and transparency far outweigh the costs."

OceanScore produces an ERP style compliance manager software tool, which can automate the work of compliance tracking. It helps companies maintain complete and accurate vessel operational data. It helps companies put EU ETS and FuelEU clauses in charter party contracts, and make the correct invoicing.

Companies using it include MSC, V-Ships, Tsakos, Döhle Group, Norbulk, and Nordic Shipmanagement. TO

DNV perspectives on emission reduction

DNV experts shared perspectives on the complex decisions shipowners need to make about emissions, and the pathway to more sophisticated emissions data management systems

While IMO emission regulations do not yet have enforcement in place, the European Union legislation is putting a price on emissions, driving much bigger efforts to manage them, said Knut Ørbeck-Nilssen, CEO Maritime, DNV.

Knut Ørbeck-Nilssen, CEO Maritime, DNV, speaks at DNV's Maritime Energy Transition Summit

He was speaking at the DNV's Maritime Energy Transition Summit held online on February 6.

IMO may bring in prices on emissions in 2027 if member states can agree, he said.

And cargo owners, financiers and wider society are also pushing for decarbonisation.

Shipping companies have complex decisions to make, including determining which alternative fuels to adapt their fleets to, and if there will be enough supply of them.

They need to determine what energy efficiency measures to implement, and how effective they will be. They need to work out what role data plays, and how to integrate this into operations.

Shipping companies need to decide whether to be a "first mover, fast follower, or slow adapter."

It is hard for shipowners to find the best combination of technologies, and "the effectiveness of many measures is still to be validated."

"These are not questions with simple answers," he said.

While yard space remains tight and newbuild costs are high, it is hard to invest in newbuilds and retrofits. Then there is the factor of limited supply and high costs of future fuels.

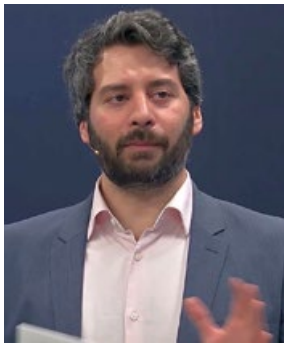
Yet we have just seen another record year of new orders for 'new fuelled' vessels, he said.

An optimal combination of energy efficiency measures can deliver fuel savings up to about 16 per cent. This could contribute to the bulk of reductions required to meet the 2030 goal, while supply of alternative fuels is developed.

Must keep moving

"As we continue to push forward with our decarbonisation efforts it is important to acknowledge that progress may not always come in straight lines," he said.

"There are numerous challenges which may slow down the pace - technological immaturity, regulatory hurdles, economic constraints, geopolitics," he said.



Jason Stefanatos, Global Decarbonization Director with DNV

"It is crucial we never lose sight of our goals. It is like riding a bicycle. To keep balance we must keep moving. We must remain committed to our vision of a sustainable and carbon neutral maritime industry."

Emissions data

Fuel EU maritime and ETS have been "game changers" in the way shipping deals with data, Mr Ørbeck-Nilssen said. "For both, verified data is a vital element extending beyond compliance. It is also crucial for maintaining operational and commercial integrity across the maritime value chain."

"Shipowners, managers and charterers now depend on reliable, standardised data related to emissions compliance. Doing this well instils trust between parties, paving the way for efficient decision making and smooth commercial elements."

When the EU's Monitoring, Reporting and Verification regulations first kicked in, in 2018, the majority of the fleet was reporting in an "old fashioned way," such as with spreadsheets, said Jason Stefanatos, Global Decarbonization Director with DNV.

Since then, "there was a big transition to more advanced reporting systems."

As regulatory complexity increases, "I expect to have a maybe even bigger transition to more advanced reporting systems."

When you implement energy efficiency measures on your fleet, you need monitoring with KPIs so you can see if it is working.

Line Dahl, Head of Customer Success and Onboarding with DNV, speaks at DNV's Maritime Energy Transition Event

The data infrastructure becomes increasingly important, he said.

Better emissions data also helps shipowners assess the best solution for their fleets and for each voyage route, he said.

Emissions data ecosystem

With the data requirement of the EU Emission Trading Scheme, "It's no longer enough to check in with data once a year, we need continuous oversight," said Line Dahl, Head of Customer Success and Onboarding with DNV.

The Fuel EU Maritime regulation allows the bringing of data together from multiple vessels, but this is only possible if you have "good control over operational data," she said.

To do it, you need an "emission data ecosystem", tracking data from its source to where it is used.

"A single reliable source of emissions data can transform your operations."

Many shipping companies use multiple systems for emission reporting which do not integrate well, which makes this very difficult, she said.

DNV has been developing an "operational data standard" which brings clarity and interoperability to emissions data, she said. It enables companies to gather emission data from ships around the world, submit it to statutory services, and enable it to be verified.

The video of DNV's Maritime Energy Transition Summit (METS) 2025 is online at **https://www.dnv.com/maritime/webinars-and-videos/on-demand-webinars/**

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Emission perspectives from Hapag, Prominence, China

Hapag Lloyd, Prominence Maritime and China shipbuilding association CANSI shared perspectives on emissions data and decarbonisation at the DNV Energy Transition Summit

Customers of container shipping line Hapag Lloyd expect data "in good quality in the form they need." This means within 1 per cent accuracy, said Dorina Schwartz, Director Fleet Energy Efficiency, Hapag-Lloyd.

Dorina Schwartz, Director Fleet Energy Efficiency, Hapag-Lloyd (left) speaks to Line Dahl, Head of Customer Success and Onboarding with DNV, at DNV's Maritime Energy Transition Event

She was speaking at DNV's Maritime Energy Transition Summit held online on February 6.

The company has varying data requirements in its fleet.

For vessels it owns and manages, "we really need to be on top of the data by the minute to take care of issues," she said.

For vessels managed by ship managers, it needs to do due diligence on the data.

For vessels it charters into its fleet operated by other companies, Hapag Lloyd pays for the EUAs (emission allowances), so has to ensure that data is correct and it is purchasing sufficient EUAs.

Sometimes data is available from multiple sources, and it can be compared as a means of spotting errors, she said.

It is important that all parties involved have a common understanding of the data requirement, she said.

Hapag Lloyd uses DNV's emissions data management service.

This provides the company with the data foundation it needs to implement the necessary solutions, manage the risks associated with regulatory compliance, and increase competitive advantage, she said.

There will be a growing requirement for automated data sharing in the industry, she said. And the industry is far from being able to do that. "We need to be able to combine data sources wherever they come from."

Prominence Maritime

Ioanna Procopiou, CEO, Prominence Maritime, speaking at the DNV Maritime Energy Transition event

"Ships built today are 25-30 per cent more efficient than ships built 15 years ago," said Ioanna Procopiou, CEO, Prominence Maritime, which manages 6 bulk carriers.

"When considering retrofits, you have to consider the remaining useful life of the ship. You need to do analysis to see what the benefit is going to be."

However the company uses silicon paints on all ships when they go to dry dock no matter the age. "We've seen much better performance," she said.

"We put ducts in some cases."

The regulations create a lot of work keeping track of emissions, she said. And Europe's emissions related costs are "going to make trading with Europe quite expensive."

"The shipowner is not going to subsidise the trade."

"Unless there are tangible outcomes of this payment system, it's going to be an uneconomic burden to everyone.

The regulations seek to make use of fossil fuels more expensive, to make alternative fuels more attractive. "But alternative fuels are not available in the scale we hope," she said.

"It would be risky to abandon fossil fuel prematurely [when] there's no technology to replace fossil fuels."

Running a vessel on green fuels (from renewable energy) will be particularly expensive. Ms Procopiou calculates that a large container ship running on green methanol would need 36 wind turbines dedicated to producing electricity to make the green methanol. The total cost of this would be $100k a day. "The numbers we are talking are insane."

With the challenges of both price and availability, "for a pure tramp operator, I think it's going to be almost impossible."

China shipbuilding

The Chinese shipbuilding industry now "has a two thirds market share", claimed Li Yan Qing, General Secretary, CANSI (China Association of the National Shipbuilding Industry).

"[The] China shipbuilding industry has a great achievement. We can say China is in the leading place for the global shipbuilding industry. "The global maritime industry has high expectations from Chinese shipyards."

Most shipyards have formulated or published green development strategies, he said. ""Most Chinese shipyards will consider different compositions. Air lubrication systems, high efficiency propellers, other technical measures together," he said.

There are many debates in China about what the future fuel will be, although people often base their arguments on where they are employed, he said.

"If you come from ICE [internal combustion engine] factories, it defines your technical position.

"If you come from battery products, or duel-fuel producers, you will say in the future, 'all electrical driving vessels.'"

China already has much experience with electrical vehicles, with so many electric car companies, he said. TO

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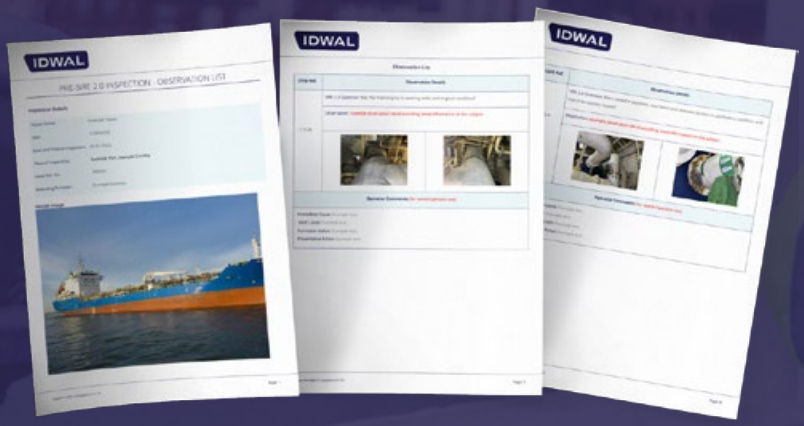

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Emissions regulatory update

IMO is planning the next set of GHG regulations; EU is developing a Sustainable Transport Investment Plan, and will review FuelEU Maritime in 2026-7; some regulatory developments discussed at DNV's event

In the emissions regulatory space, "the pace has really picked up," said Eirik Nyhus, Director, Environment, DNV.

He was speaking at DNV's Maritime Energy Transition Summit held online on February 6.

Eirik Nyhus, Director, Environment, DNV, speaks at DNV's Maritime Energy Transition Summit

IMO is "on the cusp" of adopting a set of greenhouse gas regulations which "will be very significant in creating drivers for alternative fuels."

But there are some very difficult political questions to resolve, and technical design features to fix first.

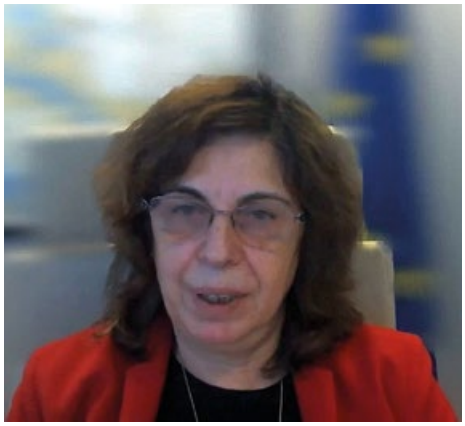
It needs to be done by the MEPC 83 meeting which takes place on April 7-11, he said.

In the European Union, there are still further clarifications being made on issues relating to ETS and Fuel EU Maritime, and perhaps amendments in the "not too distant future".

The UK is looking at setting up its own emission trading scheme from January 2026.

Mr Nyhus said that CII is "up for review" in 2025, but the IMO correspondence group has concluded that all issues identified with CII have been pushed into the future (beyond 2025). "For those you hope we will fix some flaws in the system you have to hold your breath a bit longer."

IMO is expected to put its "Global Fuel Standard (GFS)" or "Greenhouse Gas Fuel Intensity (GFI)" standard into regulation in 2027, and it may come into force any time between 2027 and 2029.



Fotini Ioannidou, Director of the EU Commission's Directorate-General for Mobility and Transport, speaks at DNV's Maritime Energy Transition Summit

European Union interview

Fotini Ioannidou, Director of the EU Commission's Directorate-General for Mobility and Transport, was asked what development we might see from the EU in terms of further regulation or evolution of existing regulation, EU ETS and Fuel EU Maritime.

"Our focus for the coming years will be to effectively implement these two regulations," she replied.

"They are complex, they are first in its kind for the sector."

"We will continue to work with industry to support industry verifiers, also national authorities, in their efforts to comply with these regulations."

"We will listen to their practical concerns and experiences regarding implementation."

In 2026-27 the Commission will prepare a comprehensive report about FuelEU Maritime reviewing its effectiveness, administration burden and impact on competitiveness. Proposals for amendments may be submitted at this point.

When IMO has made the decision on its measures in April, EU will make an assessment of "complementarity", comparing IMO's measures with its own.

In 2025, EU will also put together a Sustainable Transport Investment Plan, a Maritime Industrial Strategy and a EU Port Strategy.

Making things easier?

Ms Ioannidou was asked if any of the reporting burdens might be reviewed in 2026-27, following the European Commission's stated aim to reduce reporting obligation for business by 25 per cent.

She replied that efforts have been made to minimise inconsistencies between ETS and Fuel EU Maritime. Operators are allowed to use the same data for their monitoring plans.

Further improvements are possible. For example the 'responsible entity' for ETS and Fuel EU are different companies, and they could be aligned.

Ms Ioannidou was asked if there was a possibility any regulations might be 'sunsetted' or changed to be more in alignment with IMO regulations.

"That's another difficult question," she replied.

Both FuelEU Maritime and EU ETS regulations include a requirement for the European Commission to assess complementarity with IMO global measures.

While EU would like to have alignment between EU and IMO measures, it would also need to take into account the level of ambition, scope and integrity of IMO measures, and determine if IMO rules would be a replacement. The first priority is for EU to have its own "sound and ambitious framework."

Alternative fuels

Ms Ioannidou was asked what EU is doing to encourage the supply of alternative fuels.

She replied that EU is doing work with the Renewable and Low-Carbon Fuels Value Chain Industrial Alliance which facilitates collaboration with many stakeholders to accelerate adoption of sustainable fuels.

EU will release a "sustainable transport investment plan, probably around summer."

This will "provide an industrial strategy framework with roadmaps for each mode of transport and fuel type" and "will discuss how we expend EU funding mechanisms to make sure that the price gap between renewable and fossil fuels is closed."

TO

Developments with biofuels and wind

Biofuel demand from shipping did not expand much in 2023, but is expected to grow now due to FuelEU Maritime; wind power does not yet cover its costs fully, but that may change. Discussions at a DNV event

Biofuels is proving the most popular solution for FuelEU Maritime compliance, said Øyvind Sekkesæter, Consultant in Maritime Environmental Technology, DNV.

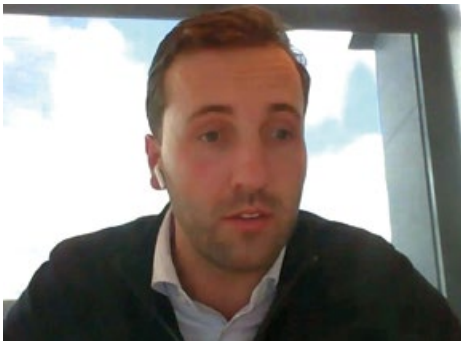
He was speaking at DNV's Maritime Energy Transition Summit held online on February 6.

They are available today, and many have a "drop in capability" allowing them to be used without any engine modifications.

The global supply of liquid biofuels, including FAME, HVO and ethanol is 111m tonnes a year of oil equivalent. There is a further 41m tonnes of oil equivalent of biogas being produced.

The maritime industry is only taking 0.6 per cent of this, with most of it going to road transport.

Bunker sales data from Singapore and Rotterdam shows "significant" growth in bio-blended bunker fuels (a mixture of biofuels and conventional fuels), he said.



Johannes Schürmann, Commercial Director, FincoEnergies, speaking at the DNV event

FincoEnergies

There are three types of biofuel products used by shipping, FAME, HVO and biomethanol, said Johannes Schürmann, Commercial Director, FincoEnergies, a physical supplier of biofuels to marine market in the Antwerp-Rotterdam-Amsterdam (ARA) region.

FAME is the biofuel shipping companies are most familiar with. Finco first provided it in 2018. HVO has the highest quality. Finco also has a license to supply biomethanol, but seeing "quite low" demand for it.

They are all supplied at 30 per cent blend with conventional fuels.

Finco had expected a growing demand in 2023 from companies seeking to use biofuels to improve CII data. But it did not see much growth in demand because "there's no penalty from CII."

So at that point, demand was mainly driven by the voluntary market, companies seeking to meet internal sustainability targets or make claims that cargoes were being transported sustainably.

This year, FuelEU Maritime is driving demand for biofuels, with more shipping companies becoming buyers, he said.

The company believes there are risks of a decline in demand in future, which would mean it does not get returns from its investment in biofuel infrastructure. "If we had consistent legislation we [would] know that demand will be there," he said.

"We have seen legislation at national / international level is not always consistent, and demand is fluctuating. That is 'killing' for fuel suppliers."

"On the legislative side I don't expect much change over the next 5 years," he said. "The target of FuelEU remains 2 per cent until 2029."

"ETS costs will go up a bit for shipping companies, so the [cost] spread between bio and fossil gets smaller, but not enough to cover the gap."

Not much is known about further regulations, such as more 'force' behind CII or a global fuel standard or carbon levy, he said.

There may be a growth in voluntary markets, where shipping companies can make emission cuts and "sell" them to someone who wants to take credit for them. These are normally only possible for emission cuts in addition to those required by regulation. The rules for how they are calculated are not harmonised among companies, he said.

Chris Hughes, Decarbonisation Specialist, Cargill International, speaks at the DNV event

Wind

Agricultural products trading company Cargill was an early pioneer of sails. It first started planning to fit an MR tanker with sails in summer 2020, following a study which it started in 2017, together with DNV, looking at different decarbonisation options.

It took this early interest in wind because it wanted to find out what was possible and have a role in decarbonisation, said Chris Hughes, Decarbonisation Specialist, Cargill International.

Wind stood out as a way to achieve more than 10 percent fuel savings, he said. The initial modelling "showed it could be competitive from a cost perspective."

Wind propulsion does of course need a big upfront investment. Cargill seeks to focus its attention on the return on investment, not the amount of upfront capital required, he says. But it is keen to find ways to reduce installation costs.

There is still uncertainty about the savings in operating cost which can be achieved. "These technologies are still pretty new, we've got a fair bit to learn."

"Where we are today, we see the payback periods on a tramping bulk carrier are too long," he said. This means that companies are unlikely to want to install wind assisted propulsion purely for fuel saving reasons.

So, wind is only viable with the help of regulations. This could change if costs come down. There could be a 'tipping point' when every shipping company wants to use wind.

"What we're finding through the work we've done so far, today, it is doable to put wind propulsion on a bulk carrier with modest saving."

There can be limits to how much wind power you can install on a ship, he said.

If the engine is run at minimum load, the engine is less efficient. Using wind power may mean you need big angles of the rudder, which creates drag.

It is also difficult to install sails on the deck of bulk carriers in a way which still allows hatch covers to be opened.

If you use bigger sails, you get more wind force, but are more likely to run into problems with port infrastructure, such as bridges and cranes, he said.

"We don't want to expect supply chains to

change to serve our wind ships."

Cargill charters two vessels with sails: the Pixys Ocean bulk carrier, which has "WindWings" sails, and the TR Lady, which has rotor sails.

"Straight out of the shipyard, we got a 20-30 per cent [fuel saving], plus maximum 32 per cent [when] we got some really good conditions."

A typical Kamsarsmax bulk carrier (230m length) with sails should be able to save 3 tonnes of fuel a day. And perhaps the vessel can be put on a voyage which is particularly good for wind.

"What we really want to do is validate the models we are using in our simulations," he said. This would enable the company to put more trust into them.

Combining cargo owner purchasing power

The Zero Emissions Maritime Buyers' Alliance is a consortium of cargo owners seeking to combine their purchasing power to get more market force to get low carbon transport

The Zero Emissions Maritime Buyers' Alliance (ZEMBA) is a consortium of cargo owners seeking to combine their purchasing power to get more market clout to make it viable for shipowners to provide them with low carbon transport.

To illustrate, in February 2025 it announced its second round tender, for a shipping company or consortium able to provide 86 billion tonne nautical miles of e-fuel-powered shipping to be deployed starting in 2027.

This equates to 1.5 million twenty-foot containers transported from Shanghai to Los Angeles.

Ingrid Irigoyen, CEO, and president of ZEMBA, explained more about how it works, speaking at DNV's Maritime Energy Transition Summit held online on February 6.

The size of its tenders should make it easier for shipping companies, fuel providers, ports, investors, and others to commit to providing the fuels and the technologies. The provision of low carbon fuels may only be viable when they are made on a large scale. So a large scale purchase should help get this started.

Cargo owners want low carbon transportation so they can "live up to public commitments they've made to be good stewards of this planet," she said.

Cargo owners also want to ensure that the shipping industry does not get 'stuck' with so-called transition fuels (such as LNG), which "can't achieve the lifecycle reductions they are looking for."

They do not want fuels with an "obvious ceiling for scalability" because they will always be available in limited amounts, such as certain biofuels, she said.

The first cargo owners to take an interest in pooling purchasing were buyers of container shipping, she said. Their greater interest may be because they are often consumer facing, such as retail chains, and face consumer demands to decarbonise.

There has been "expression of interest" in getting involved from charterers and owners of tankers, ro-ro vessels and other segments.

They may be included in the third round. "We're keen to hear from leaders in the industry to see how this could work for them," she said.

Finding the right path

ZEMBA seeks to be "as fuel and technology neutral as possible," although the second tender was specifically for e-fuels (made with renewable electricity).

It is interested in exploring ways to give business to ships with wind propulsion or batteries.

"This is not about getting decarbonisation credits tomorrow, this is about setting the industry on a path to achieving its goals in 2040 and 2050," she said.

ZEMBA is a big supporter of the "book and claim" approach, where fuels can be paid for by one company, but used on another company's shipments. This enables more flexibility.

Ingrid Irigoyen, CEO, and president of ZEMBA (screenshot from webinar)

Otherwise, it could only work if (for example) all of the shippers using a certain container ship wanted to pay extra for the low carbon fuel, and the fuel was available for that voyage. "To align all of that is virtually impossible," she said.

"Book and claim" requires comprehensive auditing /verification, to make sure the low carbon fuels were actually used and only paid for once, she said.

Some shipping companies offer shipments with low carbon fuels but do not necessarily move the cargo of the actual buying customer using low carbon fuel. So it is similar to "book and claim", but done internally. ZEMBA calls this the "mass balance approach."

Do we need regulation?

Ms Irigoyen was asked how far voluntary measures could go in decarbonisation.

"Voluntary corporate action is tremendously important for sending the right signals and getting new signals in the market," she said.

"But it is really a start. It is really [only] the leaders that are doing this voluntarily."

"If you think about the many companies around the world that use maritime transport, we cannot expect a majority of those to be willing to pay a premium. Not all companies are able to do that. They do not have cash on hand for that flexibility. So, policy is absolutely essential."

ZEMBA hopes that voluntary action by its members will "give policy makers some insights," she said. They will be able to see that zero-emission fuels can work.

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DeepSea and using AI to predict fuel consumption

Eastern Pacific Shipping was able to predict weekly fuel consumption to 0.8 per cent accuracy with models built by DeepSea. They explained how it works and what the business benefits are

Eastern Pacific Shipping (EPS) of Singapore was able to predict its weekly fuel consumption to within 0.8 per cent of actual consumption, using models developed by DeepSea of Athens.

The models are trained by being provided with data for a number of previous voyages, including the vessel's route, speed, loading, weather conditions, draft, trim, fouling and other factors, and what the fuel consumption was.

DeepSea and EPS spent 6 months during 2024 building a separate predictive model for each vessel. There are 140 vessels in EPS' fleet, including 20 LPG vessels, 14 car carriers, 52 tankers, 30 bulkers and 35 container ships.

Models are tested to see how much the prediction compares to actual fuel consumption in subsequent voyages. They are also statistically tested to see how they would perform in operational conditions which have not been seen.

In the model testing, DeepSea also seeks to evaluate the level of uncertainty in the model.

DeepSea now describes modelling speed/fuel consumption as "now largely a solved problem."

Benefits

Shipping companies normally use fuel tables to make these predictions, but the AI model can make predictions with much more accuracy.

AI models can consider more factors, such as gradually increasing fouling on the hull.

The model can be used to inform voyage planners how much fuel the vessel would need for the planned route and required arrival time. This information can then be used to make business decisions, such as whether a slower speed and later arrival time is beneficial.

With more accurate fuel predictions, shipping companies can provide more reliable speed and fuel consumption warranties to their customers (charterers).

Dr. Konstantinos Kyriakopoulos, CEO and Co-founder of DeepSea Technologies

They can also better manage vessel performance, reacting faster to problems which make vessel performance worse. They can better understand the factors which drive performance. They can plan hull cleaning at the best time.

You can set the fuel consumption to the right level for the vessel to arrive at its time slot in the berth, so minimise waiting time.

You can use it to detect fuel consumption suddenly rising from normal patterns, which may indicate an equipment fault.

You can make plans for the year, such as the best way to reach CII targets, or the best commercial performance.

Then there are tools for optimising voyages in real time, adjusting vessel speed, making decisions between reducing fuel costs or maintaining the number of voyages.

The models can also determine the extent of hull fouling, which is very useful since it usually be measured directly. If you have two identical (sister) vessels, but one has more fouling, the model can compare the data to work out how much fouling is affecting performance.

If the vessels are not identical, the AI can work out the extent of fouling by transferring certain insights from one vessel and recalibrating them for the hull and engine of the second vessel

About EPS

DeepSea has developed and tested models for many other shipping companies, although EPS was the first to agree to publishing data about the model accuracy. Many DeepSea customers have much smaller fleets than EPS, such as 10-30 vessels.

Pavlos Karagiannidis, Fleet Optimisation Manager at Eastern Pacific Shipping is "absolutely brilliant," says Dr. Konstantinos Kyriakopoulos, CEO and Co-founder of DeepSea Technologies. "He has a grand vision for what he wants to do at EPS."

EPS brings all of its fleet performance data to a central control room, where different software tools are used for different aspects of vessel performance.

Financial modelling

DeepSea developed a tool together with Ardmore Shipping to bring vessel performance data together with vessel day rates.

If the vessel goes slower, you reduce fuel consumption but also incur an opportunity cost from arriving later at the destination, the vessel may carry less cargo over a year.

The factors can be compared by calculating "Time Charter Equivalent," a measure of the average daily revenue performance of a vessel. If the vessel is being paid by voyage, then the longer the voyage takes, the less the daily earnings.

Need for good data

The biggest limiting factor for shipping companies in their ability to build predictive models is now availability and quality of data, says Dr. Kyriakopoulos. "The more data you have, the better model you can create."

EPS decided to make further investment in its sensor data as a means of further improving the quality of the models.

Sensor data from ships has varying levels of noise. Data can have up to 10 per cent noise, which is considered "poor quality". But data rated "excellent quality" can include 3 per cent noise, he says.

While DeepSea does support vessels which only have noon day report data, typically noon day reports are not enough to build a high-resolution model.

High resolution models can factor in how wind direction and currents are changing from hour to hour, something which cannot be done with readings taken just once a day.

If you are trying to train a model on average data over the past 24 hours, such as average speed or average RPM, you can get into problems, perhaps half the time you had a strong tail wind, half the time you had strong trail wind, so the average is zero, he says.

"It is not that expensive - to install a torque meter and a data logger.

It is a one-off cost which brings value in the long run."

Building the models

The models are not built from a standing start. DeepSea has collected data of fuel consumption and operations by the minute from around five hundred vessels altogether, counting for 800 years of sailing (not including time in port).

This gives it an understanding of the fuel consumption characteristics of different vessel types and engines.

This enables it to build new models of a

vessel just from being given noon day report data. Although if you have per minute data, you can build a more accurate model.

The more data you have from the vessel being modelled, the less you need data from other vessels, Dr Kyriakopoulos says.

The digital structure

The models are created on DeepSea's AI driven platform, "Cassandra", which runs on the cloud.

The model is fed real time sensor data from vessels.

Shipping companies have options in how they use the models. Some use DeepSea's own voyage optimisation software, some use only DeepSea's models and connect it to their own voyage optimisation software.

In future, the systems may be further developed to incorporate knowledge of company domain experts, such as specific issues with how the vessel performs in certain situations. TO

Automatically adjusting propulsion to changes in wind power

If you are using wind propulsion together with mechanical propulsion, it may help if you can adjust mechanical propulsion automatically as wind power increases and decreases. Daniel Koch of Manta Marine explains how this can be done

By Daniel Koch, Head of Vessel Optimisation, Manta Marine Technologies

With wind assisted propulsion well-established as a proven, scalable solution for reducing carbon emissions, operators have now turned to opportunities to maximise fuel savings.

This requires that the usage of wind power is seamlessly integrated with a vessel's fuel propulsion systems.

Operators must ensure that propulsion is dynamically optimised, without adding to costs via greater manning requirements or a significantly higher administrative burden.

Technologies like Manta Marine's FuelOpt can automatically adjust engine settings in real-time, ensuring vessels operate at maximum efficiency and wind energy is used to its maximum potential.

It independently monitors engine speed, propeller pitch, and thrust from wind power. Those inputs are used to dynamically control the vessel in order to maintain a target state chosen by the crew, whether that be a specific fuel consumption, speed, or engine power, all while using minimal fuel and allowing the bridge crew to have direct control of the ship.

This eliminates the need for crew members to constantly monitor and manually adjust settings. So it reduces operational complexity and enhances safety.

The system responds instantly to changes in environmental conditions, delivering predictable power output and maintaining consistent operational efficiency.

This real-time optimisation allows operators to transform wind energy from a supplementary resource into a dependable and integral component of their energy mix.

By dynamically balancing wind-assisted propulsion with mechanical thrust to achieve a set speed, FuelOpt can ensure that a constant speed and propulsive power is maintained — a factor that is often vital for smooth commercial operations.

On a longer timescale, the returns on maximised fuel savings from the integration of wind propulsion and FuelOpt can support operators with greater cost efficiency as the industry moves to more expensive alternative fuels.

Other benefits

FuelOpt is transferable between vessels, as operators choose where to deploy wind-assisted propulsion.

This will be valuable if wind-assisted solutions are taken from one vessel and retrofitted to another, for example. So investments in wind propulsion and optimisation solutions are not necessarily confined to the lifecycle of a single ship.

FuelOpt can be integrated to provide data regarding ship performance and emissions in real-time via performance support systems, such as MMT's Fleet Analytics.

The data gathered can document gains from the use of wind assisted propulsion onboard, support improvements to the Ship Energy Efficiency Management Plan (SEEMP), as well as contribute to ambitious fleet-wide improvements for operators keen to advance their decarbonisation strategies.

Controlling engine blowers

When slow steaming or harvesting the power from the wind, the vessel's propulsion power can at times be reduced to an extent where auxiliary blowers start (supporting the turbo charger).

This may trigger the vessel to start an extra auxiliary engine to support the extra power load of the blowers. This causes higher fuel consumption and can trigger a black out.

With FuelOpt, dynamic power limits allow the regulation of propulsive power to harvest as much power from the wind while ensuring safe and controlled blower operation.

Wind on tankers

Various wind solutions have been deployed on tankers including hard sails, rotor sails, suction wings, soft sails, and kites. The transition toward wind propulsion gained speed over 2024.

The systems offer either increased sailing speeds with no additional fuel cost, or the opportunity to maintain sailing speeds with reduced fuel costs.

In the tanker sector, Maersk Tankers has announced plans to deploy suction sails on some of their medium-range tankers, representing one of the largest-scale rollouts of the technology to date. Union Maritime Limited has committed to installing hard sails on 34 of its newbuild vessels. TO

Ballast water treatment system developments

Warning about organisms in sediment – a third of BWMS fail – ERMA FIRST acquires Ecochlor - new record book requirements – an electronic logbook – ballast system in a container – West Canada rules clarification

If shipping companies are treating ballast water when they are loading it onto the vessel (discharging cargo), but the pipework and tanks are not completely clean of sediment, organisms from this sediment can enter the water and multiply, so the water does not pass the ballast water standard when you reach the destination.

It is a point which is easy to understand but is commonly overlooked by people planning or regulating ballast water treatment, says ballast water expert Mark Riggio.

The same point also applies to ballast water exchange. Pumping out your untreated ballast water mid ocean and replacing it with seawater is better than not treating ballast at all. But it does not mean you are ridding the ship of organisms from your departure port, he says, because they can still live in the sediment.

Canadian researchers have found that ballast water exchange may need to be done up to five times before the water meets the D-2 standard at the arrival port, which is very costly and time consuming.

Canada subsequently requested guidelines at IMO MEPC that ships must exchange ballast water 5 times if they are using ballast water exchange. Other IMO members did not accept this proposal, fortunately for tanker operators, Mr Riggio says.

Treating ballast water when loading may only makes sense if you have never loaded untreated ballast water onboard or done perhaps five ballast water loads and discharges since you did, to flush out all the sediment, he says.

A third of BWMS fail

Testing in October 2024 by Global TestNet found that 29 to 44 per cent of operational ballast water management systems are failing to remove invasive species of size above 50 micrometres in port state control inspections, a requirement of the D-2 standard.

More specifically, the regulation states that ships may only discharge ballast water with fewer than 10 viable organisms per cubic metre which are over 50 micrometres in size. The testing "routinely" found over 100 organisms of this size in every cubic metre of treated water.

95 per cent of these systems tested had passed commissioning tests, Global TestNet said, so the systems were thought to be compliant.

Global TestNet is an association of ballast water testing organisations set up in 2010.

It said that the most common reasons for having too many live organisms were mixing treated and untreated waters; improperly opening or closing valves; insufficient / infrequent cleaning of ballast water tanks; and crew having "insufficient system knowledge".

Operators should note that even if organisms are removed with high efficacy (99.9 per cent), the discharge may not meet the standard, because there may already be organisms in the tank which can multiply.

"If bypassing cleaning procedures for ballast tanks occurs frequently, non-compliance will be unavoidable," said Charlène Ceresola, BWT project manager with BIO-UV Group.

BIO-UV adds that IMO may change the ballast water regulations at the end of 2026 with requirements for maintenance and training.

Growth in orders for system replacement

Alfa Laval reported in September 2024 that it had received an order to replace 18 ballast water treatment systems for a single European shipowner.

Over the previous two years, Alfa Laval had replaced more than 250 systems from 30 different manufacturers, and the orderbook for replacement continues to grow.

"Many suppliers have reduced their commitment to customers or exited the market entirely, leading to a lack of support and upgrade options as regulations evolve," Alfa Laval said. "This is especially challenging when the systems purchased are not functioning properly."

ERMA FIRST acquires Ecochlor

In November 2024 ERMA FIRST GROUP of Greece announced it had acquired ballast water treatment system company Ecochlor.

Ecochlor's speciality is a ballast water treatment system using chlorine dioxide. The water to be treated is supplied with a low dose of a chlorine dioxide solution, called EcoBlue.

Ecochlor provides two versions of its "EcoOne" ballast water treatment system. One has no filter and uses only chlorine dioxide, consuming 10-20 KW of power. The second uses a two-step filtration together with chlorine dioxide treatment.

It guarantees regulatory compliance for every operation, to both IMO and USCG standards.

ERMA FIRST will continue to provide service to Ecochlor customers, subject to verification that they have only used original spare parts and the EcoBlue solution.

New record book requirements

In September 2024, IMO announced new requirements for hard copy and electronic ballast water record books (Resolution MEPC.369(80)). They apply from February 2025 (form of ballast water record book or BWRB) and October 2025 (use of electronic record books).

The first requirement sets information which must be included. Useful guidance on completion of BWRB entries can be found in BWM.2/Circ.80 (Guidance on ballast water record-keeping and reporting).

BWRB entries must be available onboard for at least 2 years from the date of the latest entry, and available from the company for a further 3 years.

The second requirement says that electronic BWRBs must meet the IMO performance standard. There must be a declaration onboard confirming this, issued by the flag administration or by class where authorised by the flag, following an installation survey onboard. The installation survey will include checks that entries can be made, countersigned and printed. Ships that use an electronic BWRB need this by 1 October 2025.

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Anschütz electronic logbook

Anschütz of Kiel, Germany, announced that its electronic logbook has been developed to comply with upcoming Ballast Water Record Book regulations.

The logbook has type and class approval from "major flags".

It meets IMO's new structure and data entry guidelines for BWRBs, ensuring that records are correctly formatted and easily verifiable.

Data entered in earlier versions of the system can be automatically carried over.

There are tools to validate data. The system uses blockchain to keep ballast water records unalterable. Data can be reviewed remotely.

Ballast system in a container

Scienco/FAST and UniBallast have launched a ballast water system in a 20-foot box container.

It is suitable for vessels up to 50,000 DWT, handling from 500 to 5,000m3 of ballast water in one go.

Scienco/FAST is based in Fulshear, Texas, and UniBallast is based in Rotterdam.

The Uniballast system fitted inside a box container

The system is called "InTankFITT Container."

It is Uniballast's third system fitted in a container. The first two use a different system, from TeamTech Senza.

Since the system is based in a container, it can be shared between vessels which do not need regular ballast water treatment, such as project vessels or barges. The container can be mounted on deck or on a temporary platform.

It can be connected to a port-based ballast water reception barge.

The system is provided by UniBallast both as a product for purchase, and a service (with a system for hire).

It is a version of the Scienco/FAST's filterless Ballast Water Treatment System "InTank." It uses chemical injection (sodium hypochlorite or bleach) and recirculation.

The bleach can be produced onboard using electrochlorination or dosed from bulk storage.

Dosing is continued until the required TRO (Total Residual Oxidant) level is reached. Dosing then moves to the next ballast tank. The TRO level is further checked during the voyage. The treatment reports can be viewed by crew and regulators.

The TRO sensor measures the amount of free chlorine or chlorine compounds present in the ballast water after it has been treated by the Ballast Water Treatment System (BWTS).

It is a measure of how effective the treatment has been in killing harmful organisms and pathogens. If it is too low, it means that the oxidant dose may have been insufficient; if it is too high, it indicates over-dosing, leading to environmental and safety concerns.

West Canada clarification

Canadian regulators have issued a clarification about ballast water regulations, reports West of England P+I Club. It follows enquiries from industry stakeholders including INTERTANKO.

The clarification is about which ports are required to adhere to more stringent ballast water exchange and treatment protocols.

The regulations say this is required for vessels heading to "designated freshwater ports".

The clarification states that it applies to the ports of Kitimat, Stewart, and ports along the Fraser River. It does not apply to ports in Vancouver city, specifically West of Mitchell Island and Tilbury Island, and Westridge Marine Terminal in the Burnaby region of Vancouver.

LNG carrier tank design

GTT has developed a design for a 30,000m3 LNG carrier with special ballast tanks enabling it to eliminate filling limits.

It has an approval in principle from ClassNK.

It is for LNG carriers with membrane tanks, where the tank is part of the vessel. These vessels often have filling limits, based on an assessment of how much the LNG might 'slosh' in the tank and add too much load on the steel.

With the GTT design, the ballast tank itself reduces sloshing in the tank, by being positioned higher up the side of the vessel. This leads to improved stability of the ship, reduced rolling, reduced sloshing loads and removes the need for the filling limit.

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Making port calls more efficient with a data hub

Terminal operators are learning that meeting their efficiency goals requires changes in how they handle vessel scheduling and dock operations. A central 'marine data hub' can make it easier

By Robert Kessler, Product Manager, Marine Terminal Operations, with MIS Marine

Consistently measuring vessel arrival, mooring, and departure performance isn't enough for today's terminal operators to meet their throughput and utilization goals.

They must also understand and address the many external factors that pose risks to port-call efficiency.

This requires more information and collaboration with third parties on a more comprehensive risk-management and process-optimization process.

Vessel calls now involve a broad community of interdependent maritime supply-chain stakeholders.

Terminal operators do not work alone with a single set of port data. Nor can port stakeholders achieve their efficiency goals without a shared information source that can be accessed by other stakeholders involved in each vessel call operation. Collaboration is essential.

During the pre-arrival period there must be timely and accurate communication between the vessel, terminal, surveyors, and other stakeholders. Each stakeholder needs to know when and where to find the information it needs.

It is impractical for any one stakeholder to hold all this information. Instead, all stakeholders must have access to the relevant information in a centralized location.

Robert Kessler, Product Manager, Marine Terminal Operations, MIS Marine

This prevents delays and inefficiencies caused by issues like incomplete data in a pre-arrival questionnaire, mismatched Ship-Shore safety checklists between stakeholders, and scheduling misunderstandings with cargo surveyors.

Another problem is the use of email for stakeholder communications. It has often led to information overload.

These and other port-call efficiency challenges can be solved by merging risk management and dock scheduling at the ship/shore interface.

This enhances all terminal operations activities by integrating data-driven methods with vessel-call collaboration.

The result: terminal operators can drive meaningful efficiency improvements as they reduce the risks of delays and miscommunication that often hinder dock operations.

Two major use cases

There are two key use cases where terminal operators are seeing the biggest benefits from this approach to port-call optimization with a data hub.

The first use case is the pre-arrival questionnaire. Terminals require vessels to provide extensive information before the terminal clears the ship to enter the terminal. This ensures that the terminal handbook has been read and all necessary questions have been answered to facilitate a safe and efficient vessel call.

This process involves the terminal and vessel, the Ship's Technical Operator, the Vessel Agent, and the Charterer's Marine Terminal Advisor.

During this process, the terminal may request additional information or clarifications that stakeholders can only understand if they know the previous dialogue related to the vessel call.

The information must also stay with the vessel call record in the terminal's scheduling system. None of this can be effectively managed with emails, alone.

The second use case is the ISGOTT Ship/Shore Safety Checklist for oil tankers. This checklist consists of four main sections plus several sub-sections. The sub-sections are dedicated to different aspects of the proposed operation for the tanker, the terminal, and both.

The vessel and the terminal must complete all ISGOTT checks before any transfer begins. In some cases, checks occur in locations where internet access is unreliable.

In these cases, representatives from both the terminal and the vessel must be able to enter and access information offline. They also must sign and retain the required electronic signatures, and store completed checklists with the overall vessel/terminal call records. This allows stakeholders to view and understand these checklists in the context of the entire operation.

Using a Marine Data Hub

A key element of successful collaboration is a central repository for sharing vessel certificates, answering terminal questionnaires, and managing joint checklists.

The Marine Data Hub, a collaborative venture headed by MIS Marine (www.marinedatahub.org) performs this function. It accurately collects requests from multiple terminals and categorizes them by responsible group.

This gives vessel operators a single location for all communications with each terminal and charterer, and an ecosystem for sharing data in a controlled manner. Each stakeholder has a single reference point for every vessel call, regardless of the other stakeholders involved.

Vessels and terminals are enhancing their terminal-call efficiency initiatives through data-driven approaches. When they add digital collaboration into their vessel call management strategy, they can work more effectively with each other and the larger community of port stakeholders.

They can better address scheduling conflicts, poor communication, and other challenges that disrupt terminal operations. They also can more quickly and easily resolve these obstacles, ensuring a smooth workflow. TO

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