International Chamber of Shipping

Shaping the Future of Shipping

ICS Maritime Barometer Report 2024-2025

Foreword

Building stability in a volatile world

ICS Chairman, Emanuele Grimaldi

Shipping operates in a rapidly changing world, where political unpredictability has become the new normal. Not only have physical conflicts increased around the world, but we may also face escalated trade wars if the US-China relationship continues to deteriorate. Financial markets are volatile at a time where great investment is needed for a safe and greener future for our industry.

This geopolitical instability is making and reshaping our business operating environments, adding caution and uncertainty to commercial decisions, in addition to re-writing long-standing trade relationships and trade routes. These all have costly implications for our industry and the wider economy, strengthening the possibility of a global recession.

Thanks to maritime leaders sharing their views with us, we have a clear picture of just how big a risk political instability is to business operations, with data showing that this has consistently been the top risk since the 2022-2023 ICS Maritime Barometer survey. What is new this year is the all-time low in industry confidence to handle the risk that this poses to individual companies and our sector as a whole.

These insights guide the manner in which we champion our members, letting us know that we need to increase our ongoing collaborations with governments around the world and lobby for shipping and wider maritime's unique needs. ICS has worked hard to secure protections for shipping and repatriation of crews caught in the crossfire of global conflict. We have collaborated with stakeholders to push forward updates to the ILO's Maritime Labour

Convention, where provisions have been made for crews to be designated keyworkers, requirements for seafarer repatriation have been strengthened, and visa free shore leave ensured.

Of course, when political volatility looms large, leaders become more risk averse. There is a desire to turn to known, trusted and more predictable ways of operating. This is evident from the shift also towards LNG as the most viable fuel option for the next decade. However, the major outcomes from the International Maritime Organization's (IMO) Marine Environment Protection Committee (MEPC) 83 – and the MEPC Extraordinary Session later this year – may help catalyse the private and public sector investments needed to unlock near-zero and zero emissions fuel and technology commercialisation, infrastructure and vessels ready for those fuels and technologies. We must remain on course if we are to reach our 2050 target and keep the big picture in mind at all times.

Geopolitics also underpins some of the growing threat we face on the cyber security front, with state sponsored or linked attacks on the rise. It is vital that we continue to assess where our weaknesses lie and create robust response and recovery strategies that are well-communicated and understood across all strata of employees. While the future is no doubt more digitally connected, we must carefully navigate the use of AI, ensure proper crew capability and business resilience.

Above all, collaboration and communication are key. In the face of what can feel like an unseeing or uncaring political system, we must strive as an industry to speak loudly with one voice. We must bring our challenges, solutions and collaborative spirit to the table to enact positive change for us all.

I invite you all to use the insights from this year's ICS Maritime Barometer to focus your minds, identify opportunities for your organisations and catalyse our industry to action. Together we can ensure that maritime continues to be greener, safer and more resilient in a world of turmoil and change. Together, we can build stability for the future.

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Executive Summary

The risk landscape for shipping is often defined by a single dominant issue that is not only cause for concern itself but complicates other factors that it intersects with. The pandemic and global recession have been these risk multipliers in the past but have lost ground to political instability in recent years. In a world that has fast become more volatile and unpredictable, maritime leaders have identified political instability as the biggest risk to their operations for the second year running – with impact demonstrated on multiple other factors.

This instability underpins all other top risk factors identified by respondents – administrative burden, trade barriers and cyber-attacks – all closely tied to governments and geopolitics. Cyber-attacks by state and non-state actors have increased. A 2025 report by the US Government Accountability Office warns of urgent action needed in the maritime sector to address cybersecurity vulnerabilities that leave it open to such threats. The wider industry's increasing reliance on digital infrastructure and AI keeps this risk high on the agenda.

Analysis of four years of ICS Maritime Barometer survey data reveals a decline in maritime leaders' confidence to manage the risks from political instability, which is unsurprising given the pain points over the past few years. Political polarisation and global conflict have continued to escalate in the wake of 2024, which marked one of the biggest global election years in history. Companies have had to adapt to rapidly changing operational landscapes, with crew and vessels too often seen as collateral damage and malicious physical attacks remaining a high concern.

That said, shipping is known to be resilient. And while the ongoing US-China trade war adds further uncertainty, it also opens new opportunities as trade is re-routed and new deals are explored between nations and the EU to secure greater supply chain stability. China looks set to grow its trade with the Global South, while Latin American countries are seeing greater export opportunities as their goods become more attractive to US and global buyers.

Regulations remain the most significant factor among key green transition issues impacting business operations. Much of this change is driven by evolving rules from the EU and IMO. The outcomes in 2025 from the IMO's MEPC 83 meeting, including the Net Zero Framework, could sustain the high levels of industry confidence recorded in this year's survey to handle the impact from regulations and market-based measures, if supported by pragmatic policies that are easy to work with and operate in practice.

Given the uncertainty around global politics and changing decarbonisation regulation, maritime leaders are decidedly more bullish towards tried and tested fuel options – shying away from their confidence in all near-zero and zero alternative fuels and technologies over the next decade. Instead, LNG, HFO with abatement technology, and biofuels are clear frontrunners in this year's findings - with a majority of 55% of respondents backing LNG.

Methanol and ammonia remain key future fuel choices, but, as the realities hampering alternative fuel availability and infrastructure become clearer, leaders appear to be more comfortable planning operations around fuels with established infrastructure, known bunkering and safety procedures and clearer cost profiles. Shipping risks missing its decarbonisation targets without strong economic and regulatory signals plus increased public funding - which currently sits at a four-year low in confidence and one of the top impact factors.

Both public and private investment are needed to drive final investment decisions in the energy sector and enable scalable adoption of low emission fuels and technologies at the rate required for a rapid green transition. The economics of future fuels can otherwise seem insurmountable for industry, with high initial production costs, therefore high fuel costs, only able to fall with significant investments and deployment of infrastructure and technology. It is up to the big players, including governments and banks, to buoy the confidence of shipping leaders and ensure that there is a firm foundation for more ambition on the energy transition front.

Given the pressing concerns of political instability, regulation and public funding, closer collaboration between industry, governments and regulators is essential if shipping and the wider maritime sector are to ensure sustainable and resilient business operations.

	HIGHEST RISK TO OPERATIONS	GREATEST IMPACT ON OPERATIONS
2021-2022	• EPIDEMICS & PANDEMICS • CYBER ATTACKS • INCREASING ADMINISTRATIVE BURDEN	• REGULATIONS • INVESTOR REQUIREMENTS • STRANDED ASSETS
2022-2023	• POLITICAL INSTABILITY • FINANCIAL INSTABILITY • CYBER ATTACKS	• REGULATIONS • INVESTOR REQUIREMENTS • MARKET-BASED MEASURES
2023-2024	• POLITICAL INSTABILITY • CYBER ATTACKS • MALICIOUS PHYSICAL ATTACKS	• REGULATIONS • AVAILABILITY OF TRAINED CREW & PERSONNEL • PUBLIC FUNDING • MARKET-BASED MEASURES
2024-2025	• POLITICAL INSTABILITY • CYBER ATTACKS • INCREASING ADMINISTRATIVE BURDEN • BARRIERS TO TRADE	• REGULATIONS • PUBLIC FUNDING • PRIVATE FUNDING

Introduction

The 2024-2025 ICS Maritime Barometer is the latest full-scale annual survey of risk and confidence among maritime leaders.

C-suite global decision-makers from across the industry, nearly 43% of whom are shipowners and 30% are ship managers, have provided insight into key factors influencing their decision-making and the confidence they have in mitigating the impact of ongoing challenges to their business operations.*

The survey and its responses capture year-on-year data on the following:

- C-suite perception of the key challenges and opportunities impacting the maritime sector today.
- The evolving risk profiles of the industry.
- Changes in confidence when it comes to a business' capacity to respond to or mitigate impact.

The result analyses year-on-year trends while comparing these against the current year. This not only highlights industry priorities and perspectives on factors that will be critical to the short-term success and long-term viability of the sector, but also indicates shifts in perception on these issues from 2021-2022, 2022-2023, and 2023-2024.

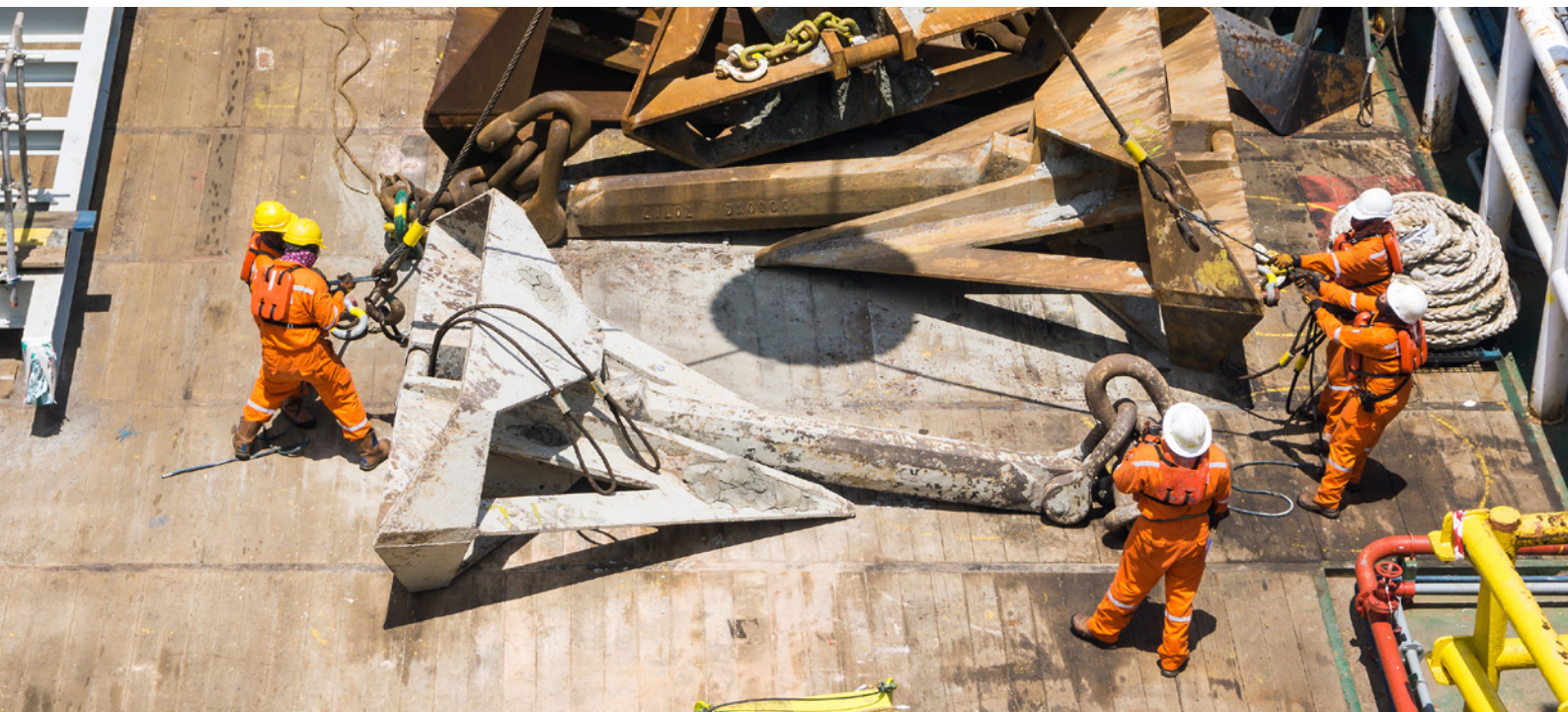
By consistently tracking industry perception of risk and impact, the ICS Barometer is a valuable tool to assess the responsiveness of the maritime industry to global and regional challenges, industry preparedness on decarbonisation, and responsiveness to key factors within and external to our industry.

This year's survey captures the extent to which geopolitical forces pose challenges to the industry, alongside the importance of clear regulation and strong collaboration to secure the maritime future.

The report is divided into four main sections:

- **Section 1:** Risk factors for shipping from political instability to industry reputation, how the C-suite views the threats and their capabilities around key issues.
- **Section 2:** Decarbonisation, fuels and emissions: a deep dive into attitudes towards climate concerns that are dominating industry discussion, from fuel choice to funding.
- **Section 3:** Fuels and technologies, including the perception of the viability of alternative fuels and how this has evolved over the last four years.
- **Section 4:** National Focus on the United Kingdom, which showcased the highest number of respondents this year

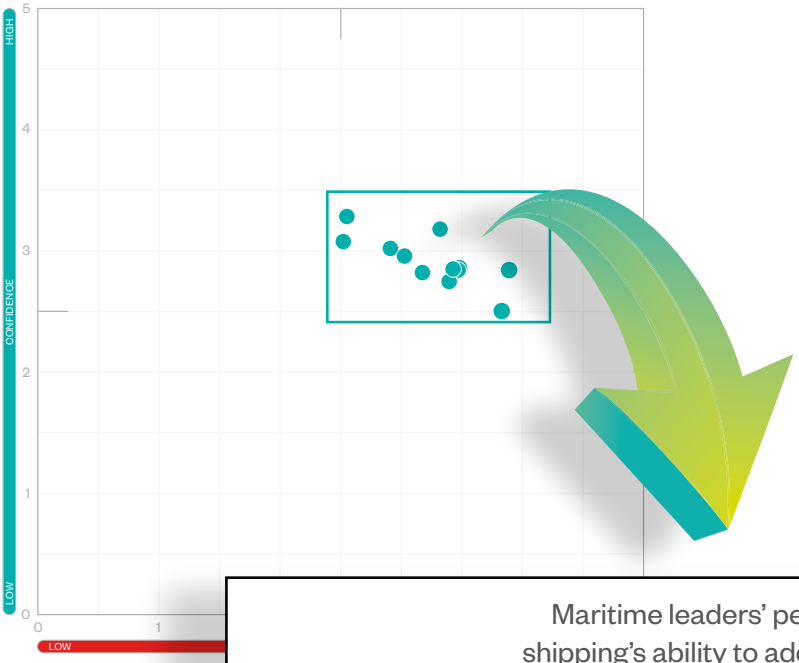
*See annexe on p42 for full methodology and participant breakdown.

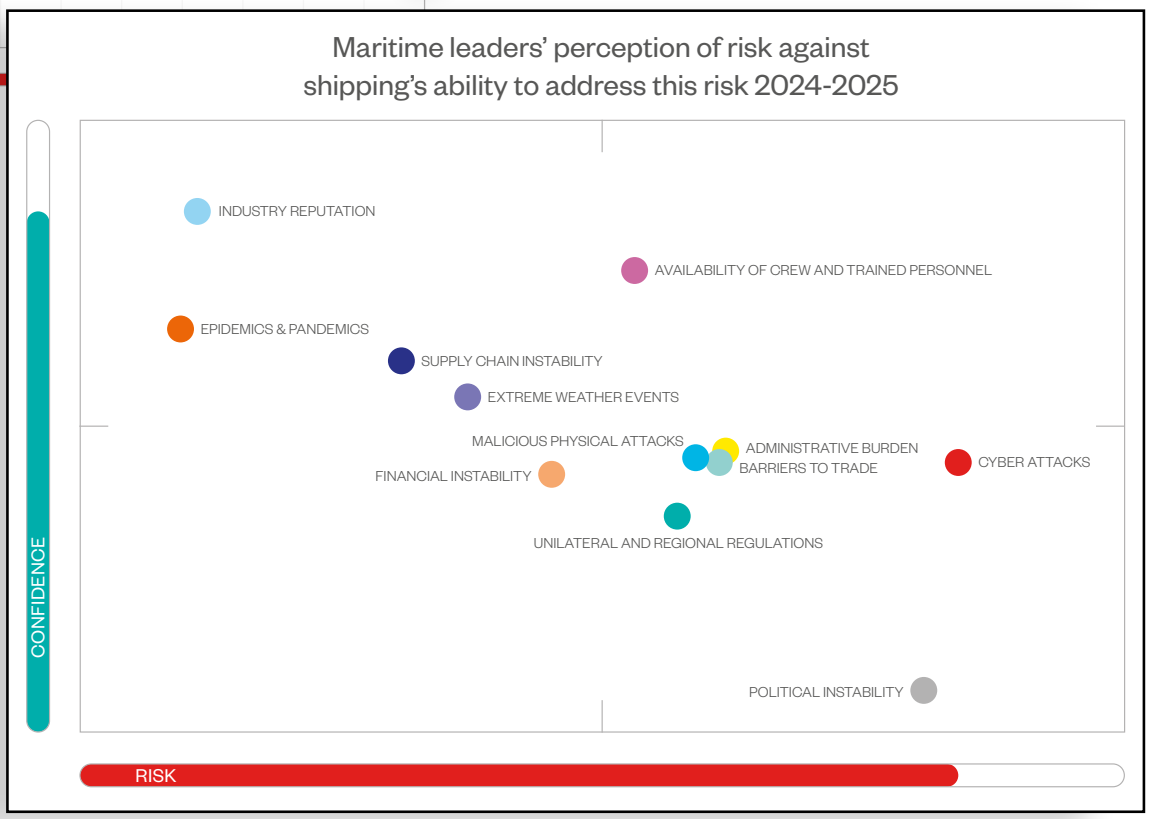


How to read the graphs

Sentiment data from respondents about each of the issues is clustered together, which is why our individual factor focus will be zoomed in to the appropriate section.

For each issue explored in the main body of this report, a standardised grid infographic visualises industry perception of risk/impact and confidence in the current and previous surveys. There is an arrow that indicates the direction in which industry sentiment is moving.





SECTION 1

Leading maritime risks and industry confidence

2023-2024

Political instability
Financial instability
Cyber-attacks

2024-2025

Political instability
Cyber-attacks
Increasing administrative burden
Barriers to trade

Overview

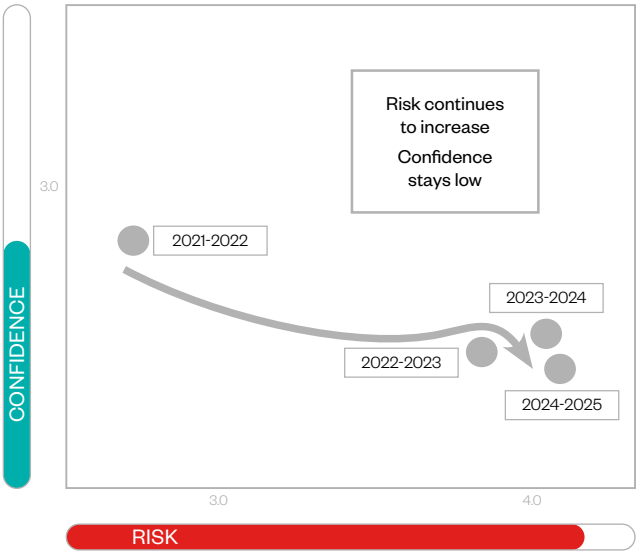
For the second year in a row, political instability has remained the forerunner for top risks, which should come as no surprise given the challenges posed by ongoing conflicts and economic upheaval. This trend reflects the growing anxiety over the state of play in world geopolitics.

Political instability was followed by cyber-attacks, increasing administrative burden, and barriers to trade, largely mirroring last year's findings. Malicious physical attacks were bumped from the top risks, but by a small margin, still ranked as the fifth highest risk this year. This year, four top risks are identified instead of three as administrative burden and barriers to trade landed very closely together on the risk axis, and these factors could easily align as interlinked issues.

When taking into account all four years of this survey, one noteworthy trend has been a clear decline in maritime leaders' confidence in their ability to steer issues related to geopolitical and regulatory challenges. It is also important to note that these findings fall neatly in parallel with this year's sentiment on future fuels, which we will come later in this report, as more maritime leaders yearn for a return to what is known and predictable, amid rising geopolitical volatility and uncertainty.

Maritime leaders' perception of risk against shipping's ability to address this risk 2024-2025

Top risk: Political instability across the globe



With multiple geopolitical conflicts and many major government administration changes around the world, including more than 70 national elections representing around half of the world's population in 2024, it is no surprise that political instability ranks as the top risk this year. As the global political dynamic continues to evolve at pace, the risk of political polarisation and new tensions is also increasing. Add to that, the full ramifications of the US Administration's imposed universal tariff are only beginning to be fully understood, and an increasingly unpredictable and unstable picture emerges.

Other US Administration changes, like those laid out by the Office of the United States Trade Representative (USTR) Section 301 Investigation also have far reaching implications for trade and maritime. The significant unintended consequences on global trade and supply chains from proposed fees on Chinese-operated and Chinese-built vessels was raised by industry representatives, including the International Chamber of Shipping, at the Section 301 public hearing in March 2025.

In this survey, political instability has now ranked as one of the highest risks for the third year running, having jumped from a very low risk with high confidence in the 2021-2022 survey, to the highest risk and lowest confidence seen so far.

While it might be expected that environmental factors would be a bigger risk on leaders' agenda, continued progress and attention to tackle associated risks with our changing climate and decarbonisation targets appear to have bolstered confidence. Positive developments at the regulatory level, developments in training and technology have led to movements in maritime, with some investment in new vessels and dual-fuel engines and technology and measures introduced to increase operational efficiencies. As such, there appears to be a steady evolution in how leaders view such challenges, and they seemingly feel more equipped to handle them.

While extreme weather (p16), environmental regulation (p15) and market-based measures (p24) do still track high in leaders' concerns, political volatility has persisted for several years now, which could point to why there is dwindling confidence in the ability to mitigate those risks.

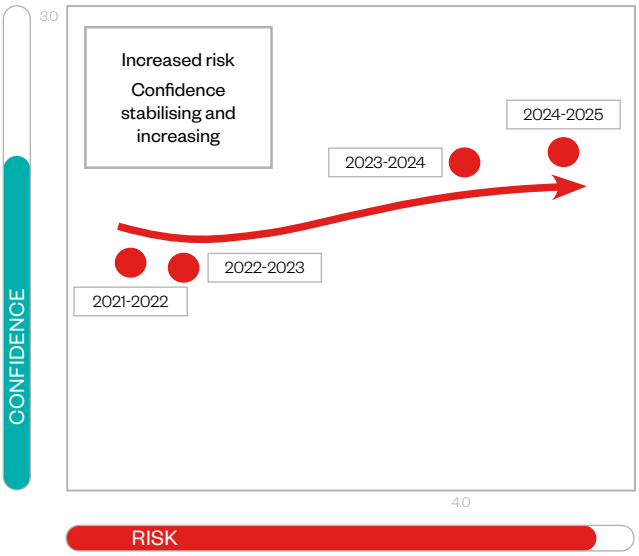
Unquestionably, business operations around the world are increasingly vulnerable to these geopolitical challenges. Consequently, in recent months, there has been an increase in interest for Trade Disruption Insurance (TDI) products worldwide. Further, a rising number of Protection & Indemnity clubs are adjusting their pricing strategies following a rise in large claims across the global marine insurance sector - and premiums are expected to rise. S&P Global expects the International Group of Protection and Indemnity Clubs (IG) to increase rates by an average of close to 5% in 2025, similar to the increase during the renewals in 2024.

The availability of war insurance is also shrinking. The conflicts in Ukraine, the Middle East, and Sudan in particular have led to war being reintroduced as a material risk for insurers to assess and quantify. This has led to many insurers either drastically increasing premiums or choosing to remove war cover from their policies. Structured credit and risk capacity is also rising among insurance market carriers, which is continuing to shift as geopolitical frictions rise, according to Gallagher Speciality's Structured Credit and Political Risk Insurance Market report.

The World Economic Forum's Global Risks Report 2025 mirrors ICS' survey findings, with 23% of survey respondents selecting State-based armed conflict (proxy wars, civil wars, coups, terrorism, etc) as the top risk for 2025. Geoeconomic confrontation, also associated with geopolitical tensions (sanctions, tariffs, investment screening), ranks as number three.

Perhaps most importantly, this instability is also sustaining concerns over a global recession that is making business leaders more careful and risk averse. GOBankingRates' *C-Suite Outlook 2025* found that the prospect of a global trade war has emerged as the most urgent and pressing matter for CEOs, while rising economic tensions between the US, European Union, and China could have the most negative influence on trade. About half (46%) of CEOs are cautious about a potential economic downturn, although this has decreased from 53% last year. It is important to note this sentiment could fluctuate in the coming months with the ongoing volatility.

Cyber-attacks see rise in risk



Cyber-attacks continue to be a serious concern for maritime leaders, ranking in second place. This should come as no surprise, with several recent high-profile cyber incidents affecting major maritime organisations and wider small-scale incidents. In fact, increased reports of vessels experiencing GPS interference and jamming have prompted the International Maritime Organization (IMO), along with the International Civil Aviation Organization (ICAO) and the International Telecommunication Union (ITU), to issue a joint statement of "grave concern".

Cyber security as a top risk is also mirrored in Allianz's 2025 Risk Barometer, which placed cyber (cyber-crime, IT network, services disruptions, malware/ransomware, data breaches, fines and penalties) as the leading risk.

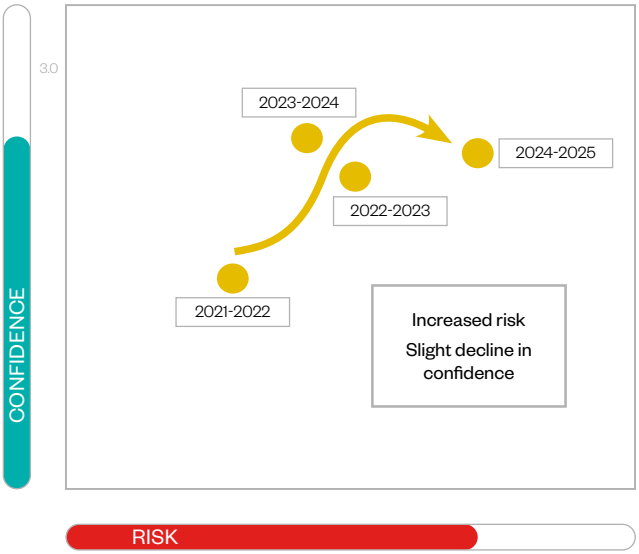
However, despite cyber security ranking as a higher risk than any previous year of this survey, maritime leaders have also demonstrated a slight increase in confidence in their ability to handle the risk. This could be linked to more awareness and understanding of cyber security risks, as well as progress towards improved cyber risk management and resilience. Gartner's Top 9 Trends in Cybersecurity 2025, states that board directors and C-suite leaders now widely embrace cyber risk as a core business risk to manage. As a result, many are pivoting away from a preventative mindset towards a resilience focus, which embraces a "when, not if" mentality. This approach seeks to minimise impact and enhance adaptability rather than outright prevention.

The growth in confidence could also signal an increased level of trust in cybersecurity resources and training, recently bolstered by rapid advancements in technologies such as artificial intelligence (AI), which is greatly enhancing cyber risk management capabilities. According to the World Economic Forum's Global Cybersecurity Outlook 2025 – Navigating Through Rising Cyber Complexities, 66% of organisations expect AI to have a major impact on cybersecurity programmes in 2025.

However, the study also notes that the global cyber skills gap has increased by 8% since 2024, with two in three organisations feeling they lack the essential talent and skills to meet their security requirements. These findings would raise a question over whether the increase in confidence is justified or misplaced, particularly as cyber threats persist and evolve. The Allianz report also ranked the risk impact of new technologies and developments in AI in the top 10 global risks for the first time (at #10).

Despite the increased confidence, it is worth noting that law firm HFW and maritime cyber security company CyberOwl'S latest report The Lifecycle Dilemma: Navigating Cybersecurity Risks Across Designing, Constructing and Operating a Vessel, found that just one in six shipowners fully understand what a cyber-secure vessel should look like upon delivery. This not only exposes a gap in the industry's approach, but highlights a growing need for owners and operators to adopt a lifecycle-wide approach that embeds cybersecurity from design to daily operations.

Administrative burden enters top three risks



Increasing administrative burden is ranked as the third highest risk this year, and is at its highest status since this survey began. Meanwhile, the confidence to handle this risk has increased since 2021-2022, but has fallen a bit from last year. This slight dip in sentiment could be down to so many different regulatory demands coming into fruition, from the EU emissions trading scheme (EU ETS), the Fuel EU Maritime Regulation and IMO regulations such as the annual operational carbon intensity indicator (CII), as well as a desire for more clarity in the wake of some recent pushback and proposed changes to some of the new legislation.

Two examples are the European Union's (EU) new Corporate Sustainability Reporting Directive (CSRD) and Corporate Sustainability Due Diligence Directive (CSDDD), both of which were intended to come into effect in 2025. But in February 2025, the European Commission (EC) adopted a proposal to drastically reduce sustainability reporting requirements in the EU and a 'stop the clock' directive to delay the new reporting requirements until 2028. Furthermore, the EC has expressed a desire to reduce reporting obligations by 25% for large private firms and 35% for SMEs, with the idea that this will increase competitiveness by cutting bureaucracy.

Despite the delays to CSRD and CSDDD, the shipping landscape is still weighted by a growing volume of regulations. This year's main legislative developments will feature advancements to: the FuelEU Maritime Regulation (FEUM), the EU ETS, the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 (HK Convention), and the UK Economic Crime and Corporate Transparency Act 2023 (ECCTA).

These developments join an already long list, which in recent years has grown to include: the Energy Efficiency Design Index (EEDI), the Ship Energy Efficiency Management Plan (SEEMP), the Energy Efficiency Existing Ship Index (EEXI), and the annual operational CII and CII rating, amongst others, plus existing financial and ESG reporting obligations.

Add to the picture, ongoing geopolitical instability, and changing training needs for crews to prepare for hybrid fuel vessels and future fuels, and it becomes more apparent as to why administrative burden is growing as a risk factor.

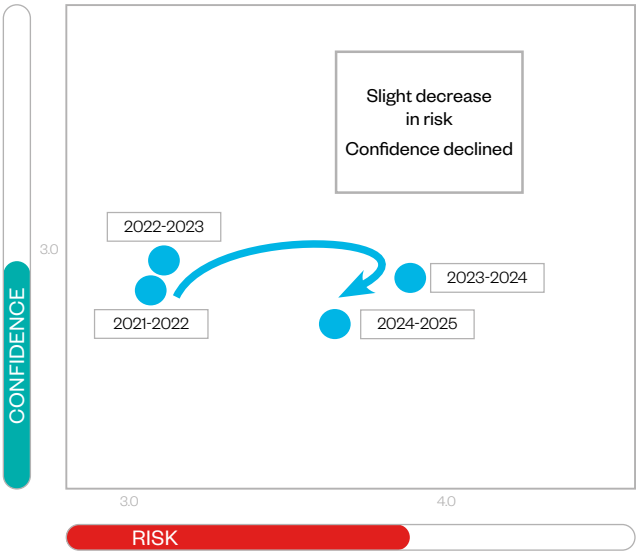
Trade barriers of rising concern

Trade barriers ranked as the number four risk in this year's survey, which closed in early March 2025, ahead of the wave of tariffs imposed by the US in April. This rating was prescient given the massive shake up of trade as a result of new tariff policies and proposals, which risk descending into a full-blown, tit-for-tat trade war at time of writing. The move has already prompted several companies to pause shipments into the US until the ramifications of the new tariffs becomes clearer, including Nintendo and the Volkswagen Group, which suspended imports of all Audi vehicles as of the time of writing this report.

There are also widespread concerns that US tariffs could translate into long-term higher inflation and slower economic growth due to reduced purchasing power. Days after the universal tariff took effect, Federal Reserve chair Jerome Powell said that while uncertainty remains elevated, it is increasingly clear that the tariff increases and the economic effects of higher inflation and slower growth will be "significantly larger than expected", and that the effects could be more persistent. Alongside this, J.P. Morgan Research lowered its estimate for 2025 real GDP growth due to heightened trade policy uncertainty, to 1.6% and down 0.3% from previous estimates.

Given the hurdles posed by international tariffs that are shifting trade patterns and an increasingly complex regulatory landscape, it is no surprise that many shipowners – including the German Shipowner's Association (VDR) – are calling for support for shipping. "Higher tariffs and restrictive measures aimed at shielding national markets result in disrupted supply chains and rising transport costs," VDR stated. "For shipping companies, this translates not only into potentially longer trade routes and higher operational expenses but also considerable planning uncertainty in global goods transportation."

Malicious attacks land in fifth place



Malicious physical attacks are still high on shipping leaders' radar, although this category dropped slightly and fell from third to fifth highest risk this year. Within the four years of the ICS Maritime Barometer survey, it was at its peak last year.

Confidence in the ability to handle the risk of malicious attacks also dropped this year. This could point to persisting anxiety over geopolitical conflicts that have led to a number of confrontations, such as the Houthi rebels launching attacks on shipping in the Red Sea, prompting rerouting to the Cape of Good Hope, as well as the heightened risk of further conflict. Despite interventions by the US, UK, and EU navies to reduce the Houthi rebels ability to attack merchant vessels and a recent decline in incidents, some feel the threat has still not disappeared. Meanwhile, incidents are rising in certain pockets, including the archipelago of Indonesia.

Yet despite this, statistics do point to a decline in global maritime incidents and piracy, which could also explain the slight drop in risk. According to the ICC International Maritime Bureau (IMB), the first nine months of 2024 saw reported incidents of piracy and armed robbery fall to the lowest levels since 1994, with just 79 incidents for the period of January-September 2024. This is down from 99 incidents in the same period in 2023. Over the entire course of 2024, piracy and armed robbery incidents decreased by 3%. The IMB did, however, still urge caution to promote crew safety given an increase in the number of crew taken hostage or kidnapped in that same time period. This is sound advice, as IMB revealed an almost 35% rise in global piracy and armed robbery incidents in the first quarter of 2025, when compared to Q1 2024 - driven by a spike of incidents in the Singapore Straits.

New risk: Availability of crew and trained personnel

This is the first year ICS has assessed availability of crew and trained personnel in its risk segment of the survey. This is in response to increased focus on training and recruitment drives by multiple organisations and to account for wider issues beyond the green transition impacting the workforce market. Namely, long-predicted skilled officer shortages as well as geographical shifts in where trained crews are sourced. This is alongside increased demand for trained crew able to handle LNG fuel, as many owners look to dual-fuel LNG vessels for the short and medium term.

The 2021 ICS/BIMCO Seafarer Workforce Report predicted a shortage of trained officers, calling for a need to significantly increase training and recruitment levels. In its 2023/24 Manning Annual Review and Forecast, Drewry warned that seafarer shortages were at a 17-year high, pointing to a dramatically increasing shortfall of skilled officers that year and which is expected to continue into 2028.

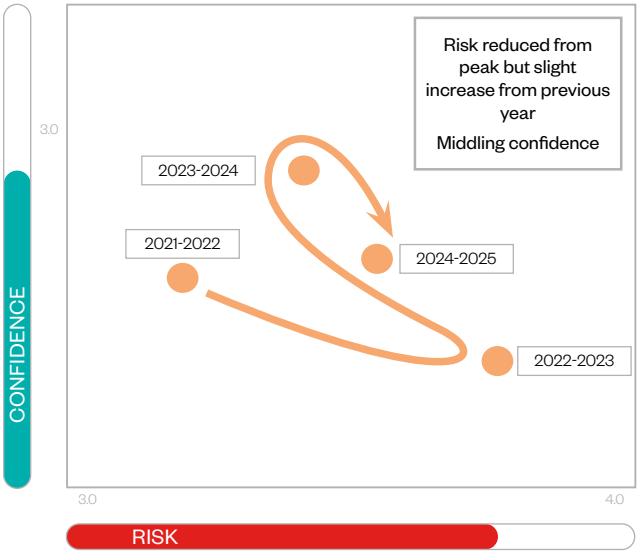
These issues have been attributed to the ripple out impact of COVID-19 on crew training and the appeal of a career at sea, as well as the impact to morale on the existing workforce causing crew to seek alternative work ashore, with more chance of flexible working, upskilling opportunities and career progression. A tightening labour market has also been blamed, in particular with Ukrainian and Russian crews returning home to join the military. Crew happiness levels fell to a 12-month low at the close of 2024, according to The Mission to Seafarers' Seafarer Happiness Index.

Despite these issues, shortage of crew and training personnel sits firmly outside the top five risks for 2024-25. Ranking 7th out of 12 risks measured, leaders also exhibit a very high confidence in being able to manage this risk. A greater expansion into labour markets outside of traditional seafarer recruitment hubs, alongside an increased focus on competitive recruitment and retention (including a focus on better connectivity on board) are likely reasons for this high confidence.

A number of countries and national shipowner associations are running concerted recruitment programmes and campaigns to showcase job opportunities in maritime, including the Japanese Shipowners Association, Norwegian Shipowners Association and Union of Greek Shipowners. Certain countries have seen dividends from these increased recruitment drives. In Germany, for example, despite a general labour shortage across all sectors, training numbers in the shipping industry have seen a 14% rise in 2024, training contracts at sea have risen to 499 (418 in 2023) and 214 onshore (previous year: 208). This can be attributed to proactive recruitment and signposting of career opportunities by shipping companies and programmes such as the German Shipowners Association's 'Vacation Crew Program' for students aged 16 and above.

Competitive maritime businesses have also focused on strengthening company culture, providing strong leadership, and indicating company values such as diversity, equality and inclusion (DEI). The latter is important in signalling company values and recruiting competitively against other industries for complex skillsets as the industry becomes more digitalised and moves towards its green transition. It is also vital for retaining those in top-level roles at sea where a lack of DEI could be seen to hamper lifelong career prospects. A looming global recession may also be prompting a return to interest in careers at sea, creating less urgent demand to proactively recruit.

Financial instability concerns on the rise



Maritime leaders' concerns over financial instability and its risk to business operations have increased from last year, with a parallel decline in confidence. It sits second to the highest risk position it has ever been, bar in the 2022-23 survey, when the world was witnessing a significant slowdown in economic growth and rising inflation as it emerged from the COVID-19 pandemic.

With a major election year in 2024 (see political instability section), multiple conflicts, including the ongoing Ukraine war and escalations in the Middle East, there has been increased volatility and uncertainty in global financial markets. Investors have shifted attention away from central banks, according to analysis by CaixaBank, and decisions are being driven by far more volatile changes occurring in the geopolitical landscape. Many of these changes are being influenced by the shifts in trade policy being implemented by US President Trump's new Administration, leading to lower expectations for US and wider global economic growth. Concerns over far-reaching unintended consequences on global trade and

supply chains of the United States Trade Representative (USTR) Section 301 Investigation from proposed fees on Chinese-operated and Chinese-built vessels has also been raised by the maritime industry.

Talk of a looming global recession is increasing. Following President Trump's Administration's shift to increased tariffs to a long list of countries and the automotive industry (see unilateral or regional regulations section), JP Morgan has increased its predictions of a global recession in 2025 to 40%, an increase from 30% at the start of the year. However, volatility is expected to continue – with the US Administration quickly lowering all its tariffs on countries to 10%, notably barring China, a week after they were enacted, causing financial markets to bounce back.

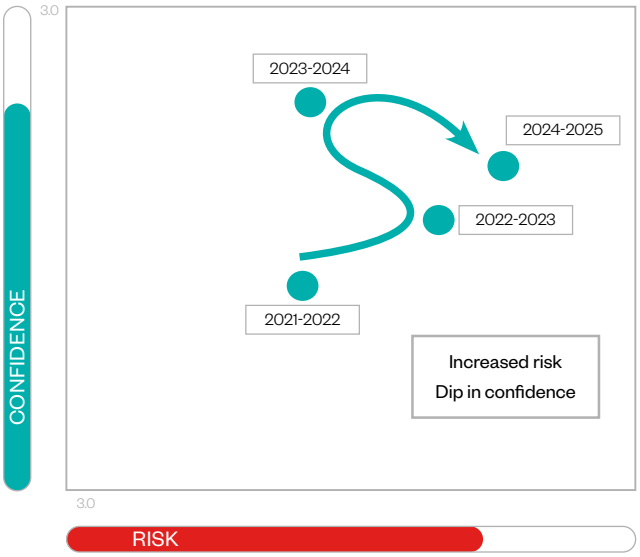
In January 2025, the International Monetary Fund (IMF) predicted a 0.4% drop in global growth projections for the next two years (below a historical average of 3.7% between 2000-19). While inflation was predicted to decline into 2026, earlier than predicted for advanced and emerging and developing economies, the IMF notes elevated political uncertainty is expected to see downturns for countries outside of the US.

In fact, UN Trade and Development (UNCTAD)'s Trade and development foresights 2025 paints a cautionary picture, with global growth predicted to slow to 2.3% in 2025, falling below the 2.5% threshold that is often associated with a global recessionary phase. It also warns that concerns over economic policy shifts have reached the highest level this century and that the fear indicators from investors are on the rise. The report warns that "many low-income countries face a perfect storm of worsening external conditions, heavy debt burdens and weakening domestic growth. More than half of low-income countries (35 out of 68) are currently in debt distress or at high risk of debt distress."

While UNCTAD's latest seaborne trade statistics, released April 2025, show that developing economies are increasing their share of maritime trade, least developed countries and small island developing states remains small due to small economies, limited infrastructure and weak integration into global value chains. The organisation underscores the vital role maritime transport plays in global trade, moving more than 80% of goods traded worldwide by volume. Up-to-date country-level data, UNCTAD stresses, is "key to understanding trade flows and guiding better transport and trade policies and investment decisions".

Governments around the world will be required to manage inflation, structural reforms and stronger multilateral rules and cooperation – which this year's survey results indicate that maritime leaders may not have much confidence in.

Risk of unilateral or regional regulations in top five risks



The development of unilateral or regional regulations sits in the top five risks to operations for 2024-25. The risk is at the highest level seen over the four years of survey data, and has seen a fall in confidence over maritime leader's ability to manage this factor (against last year). This is likely due to a combination of the shipping industry awaiting global GHG regulations to come out of the IMO's MEPC, progress of which has been slow and steady, and the implementation of regional decarbonisation regulations taking effect in shipping. Key regulatory developments include vessels over 5,000 GT being included in the EU's emissions trading scheme (ETS) from 31st March 2025 and Fuel EU Maritime from 1st January 2025. Meanwhile, the Hong Kong Ship Recycling Convention will enter into force 26th June 2025 and will apply to any ship that is flagged in a state that has ratified the convention.

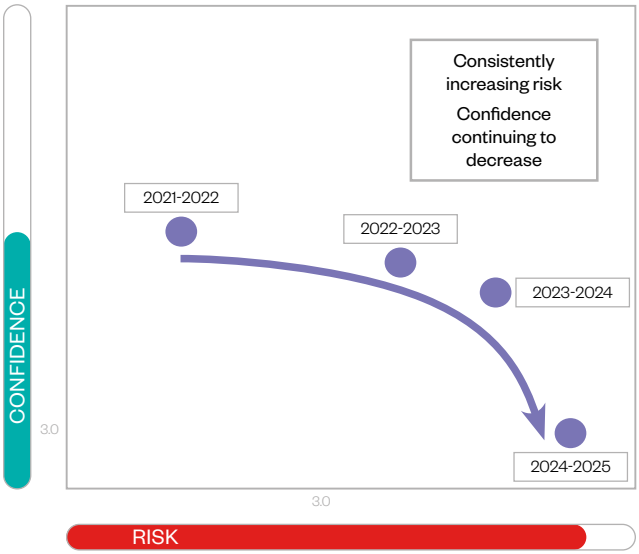
India has modernised its Merchant Shipping Bill, 2024 and Coastal Shipping Bill, 2024, aimed to incentivise shipping in the region. This updates safety measures for vessels, ports and crews as well as incentives for adopting green technology to minimise carbon emissions. Meanwhile, the UK Economic Crime and Corporate Transparency Act 2023 (ECCTA) comes into force by September 2025 for its new offence 'failure to prevent fraud', and has implications for non-UK companies with business links to the UK. Anti-fraud procedures will need to be reviewed to remain compliant. Reforms to the Nigeria Tax Bill have also been issued in the last quarter of 2024. Section 18 addresses non-resident companies engaged in shipping or air transport businesses in Nigeria and intends to address grey areas and provide legal backing for resolving non-compliance. Some claims issued by Nigeria's Federal Inland Revenue Service have ranged from USD$400,000 to USD$1,100,100 per vessel.

The reality of what is required to comply with such regulations will be sinking in for maritime leaders. Increased administrative burden will be top of mind as companies work to ensure compliance and avoid any punitive measures or fees if found to be non-compliant (see administrative burden section).

Maritime leaders may also have been predicting the impact of potential trade tariffs being proposed by the new US Administration during the time of taking the survey, which has since become clear. Some countries, including the UK, were to receive a 10% 'baseline' tariff to all imports to the US from 5th April 2025, while a raft of custom tariffs were set to be introduced from 9th April 2025, including 20% for the European Union and, at time of writing, up to 145% on imports from China. In addition, there will be a 25% tariff on car imports to the US. However, the US Administration subsequently put a 90-day pause on reciprocal tariffs, bar China, instead implementing a baseline 10% tariff rate for them all.

> The reality of what is required to comply with... regulations will be sinking in for maritime leaders

Extreme weather events climb the agenda



While extreme weather events are not viewed as one of the major risks for the industry, this risk is still rated higher this year than any of the previous four years. Simultaneously it carries the lowest level of confidence when it comes to managing the disruption these events pose to business operations. The data indicates shipping's growing awareness of the impact of climate change, linked to extreme weather events that affect ports and the wider supply chain, while damaging vessels and posing a significant risk to crew safety.

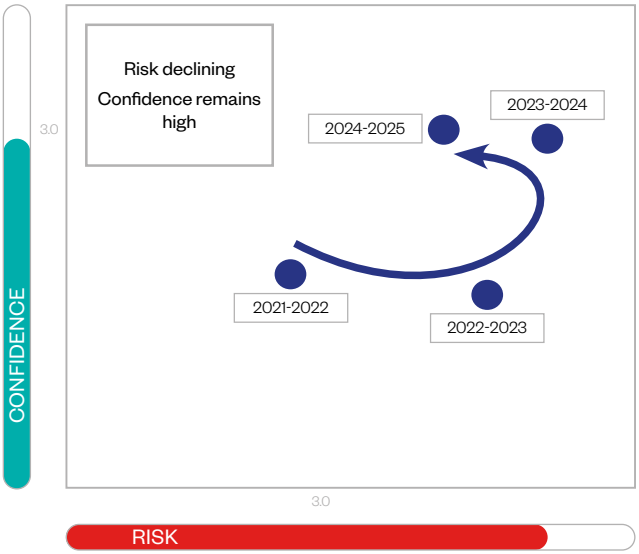
The extent to which climate change could become a significant challenge for the industry is also underlined by research. The World Meteorological Organization's (WMO) State of the Global Climate report found that 2024 was likely the first calendar year to be more than 1.5°C above the pre-industrial era. Not only was 2024 confirmed as the warmest year in the 175-year observational record but WMO data shows each of the past 10 years is in the top 10 warmest years on record. Additionally, the hurricane season in 2024 was the ninth successive season with above average activity – with 18 named storms in the Atlantic basin. An average season produces 14 named storms, seven hurricanes and three major hurricanes.

These trends have already translated into real-world consequences the industry has been forced to contend with. Key trade routes, such as the Panama Canal, have been hit with record droughts, with the Canal Authority planning the construction of a major dam to secure freshwater for locks.

Protection & Indemnity (P&I) clubs have stepped into the climate risk management fray, with the Swedish Club developing a heavy-weather alert tool as an add on to its loss prevention application, the Trade Enabling Loss Prevention (TELP) app. This tool uses the latest weather information, vessel positioning and real-time data to provide loss prevention advice to club-insured vessels operating in proximity to severe weather patterns.

It's important to note that the US staffing cuts to the National Oceanic and Atmospheric Administration (NOAA) have resulted in speculation that weather forecasts might become less reliable as a result. With maritime leaders already lacking confidence in their ability to respond to extreme weather events, a potential decrease in their ability to predict these could result in these events being viewed as posing a greater risk.

Confidence in handling supply chain instability at four-year high



Despite major supply chain instability in recent years, maritime leaders are more confident than at any time in the last four years when it comes to tackling supply chain instability, with this viewed as one of the least significant risks they face. Maritime leaders believe they are well equipped to weather supply chain snarls, with confidence levels consistent despite concerns peaking last year.

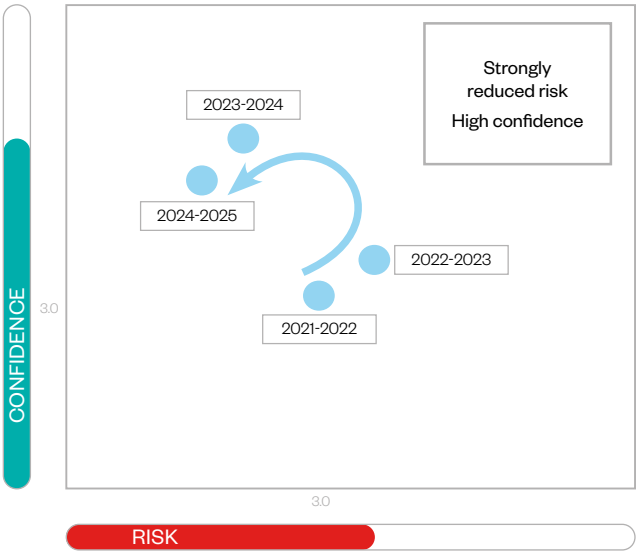
This confidence may arise from the fact shipping has demonstrated resilience in the face of the pandemic as well as black swan events when the industry rerouted vessels to avoid issues with armed groups in the Red Sea. It should be noted, however, that this rerouting could introduce a new challenge, causing increasing carbon emissions at a time when 2035 and 2050 targets must be considered.

Additionally, a range of issues could potentially increase supply chain instability, from conflict in the Middle East to Panama Canal droughts. There is also continued extreme weather driven by climate change – which can disrupt routes, damage infrastructure and affect raw material availability – while the Russia-Ukraine war continues. Further, boom and bust cycles, labour shortages, rising fuel costs, shortage of truck parking spaces, impact of sustainability regulations and associated increased costs, and that of tariffs on cross-border trade, are set to impact the trucking industry, having a wider knock on effect to the broader global supply chain.

While these are all factors that could worsen supply chain disruption, the industry is benefitting from new digitalisation technology that enables more accurate tracking of containers across the supply chain. This could help owners to streamline operations further and react more quickly and effectively to supply chain challenges. It can also boost the sharing and communicating of data across key maritime stakeholders and sectors, such as the Maritime Single Window. Companies have also been driven to increase cross sector and public sector collaboration and communication, accelerated in part by the COVID-19 pandemic, likely further easing concerns over supply chain instability.

> Maritime leaders are more confident than at any time in the past four years in tackling the risks posed by supply chain instability

Business risk linked to wider industry reputation seen as low



Industry reputation remains a low risk for maritime leaders, sitting at its lowest level in four years. For 2024-25 data, leaders have the highest confidence levels in their ability to manage this risk, out of all the factors assessed. Reputational lows from widespread media coverage during the pandemic have long since passed, likely accounting for some of this confidence boost. So too will be a general shift in attitudes within the industry to be more front footed in talking to mainstream media. For example, the IMO's Secretary General Arsenio Dominguez has made it a core goal to create "a new communication platform" with the media to help educate the wider public on the value and essential role of shipping.

Major press stories on shipping were largely focused around issues clearly out of maritime leaders' hands, including the Red Sea conflict, and the Panama Canal drought (see supply chain instability section), resulting in rising freight rates. Despite the challenges, shipping has remained resilient and continued to meet increased global demand for maritime trade. Maritime trade grew by 2.4% in 2023, according to UNCTAD's Review of Maritime Transport 2024, and predicted a growth of 2% in 2024 and an average of 2.4% annually through to 2029, pending any further negative impacts from geopolitical conflicts and climate risks.

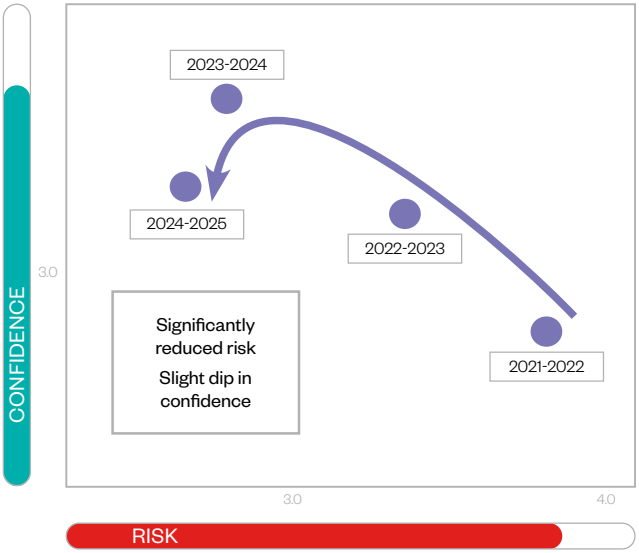
Perceiving industry reputation as low risk to business operations is relatively unique as consumer pressure is typically seen as a key lever, along with regulation, to force change in companies - for example decarbonisation and emissions cuts. While seemingly less of a concern or lever for maritime leaders, there have been public attacks on the industry for its emissions. Most recently, the group Extinction Rebellion began blocking cruise ships from docking at ports. Developments in climate litigation should also be monitored closely. Largely driven by charities and targeted at oil majors, this is something all businesses regarded as major emitters could be open to; the reputational risks, and legal costs, are both high.

Although recent high profile cases have seen courts rule in favour of businesses, it is also worth noting that island states have seen a historic win in their case presented to the International Tribunal for the Law of the Sea (ITLOS), which creates a legal responsibility to manage the impact of emission-related climate change.

> Developments in climate litigation should be monitored closely by maritime leaders

Given the risk factors of financial instability and tempestuous stock markets, the potential reputational impact of shareholder reward policies for shipping companies is an area to monitor. A recent academic study stressed the reputational necessity of paying consistent dividends, which it found to result in higher stock valuations. Those that reduce payouts run the risk of reputational damage.

Overcoming COVID-19 leaves industry prepared for epidemics and pandemics



Unsurprisingly, the risk posed by epidemics and pandemics was a top factor in 2021-2022, following the COVID-19 pandemic, when the Barometer survey first began measuring this risk. At present this is viewed at the lowest risk level in the past three years of data. There has been a slight dip in confidence when it comes to handling the impact of epidemics and pandemics when compared with last year, but maritime leaders remain highly confident they can manage the challenges these incidents pose. It is possible that reports of potential pandemics in 2024, including cases of bird flu transferring to humans in the US and UK, might have contributed to this slight dip in confidence.

However, with systems put in place during COVID-19 – including increased digitalisation, cross-national cooperation agreements and prioritisation of essential operations – some resilience for future pandemics has been built into the industry.

Additionally, shipowners, governments, and labour unions have newly agreed to a series of sweeping changes to the master agreement known as the Maritime Labour Convention (MLC), which sets minimum working standards for seafarers across a number of areas including shore leave without visas. This will avoid the issues encountered during COVID-19, when crew were forced to stay onboard vessels for months beyond their contract because they could not get ashore, or arrange repatriation. The updates to the MLC will only give the industry greater confidence that challenges during pandemics can be successfully managed, although there have been some reports of ports being reluctant to facilitate shore leave.

Additionally, while some challenges were not resolved fully, such as the long-term financial recovery of fully privatised ports, most economies have largely bounced back and are either trading at similar volumes as pre-pandemic or have rebounded (as is the case with China, despite the delay in lifting COVID-19 restrictions). This is not the case for Small Island Developing States (SIDS) and the Least Developed Countries (LDCs), which have a longer build-back timeline and are more vulnerable to even small gaps in the supply chain.

Ultimately, the risk level is not expected to shift significantly from its current low point unless an unforeseen pandemic occurs.

> With systems put in place during COVID-19, some resilience for future pandemics has been built into the industry

SECTION 2

Decarbonisation, fuels and emissions

2023-2024

Regulations
Investor requirements
Market-based measures

2024-2025

Regulation
Public funding
Private funding

Overview

Maritime leaders responding to the ICS Barometer have rated regulations as the top impact factor for the industry's green transition issues and their impact on business operations. This could tie into growing compliance and administrative demands on businesses. However, confidence to handle regulations also grew to one of the highest rankings. With more IMO regulations still pending, these confidence levels may still rise or drop depending on the outcome from upcoming Marine Environment Protection Committee (MEPC) sessions.

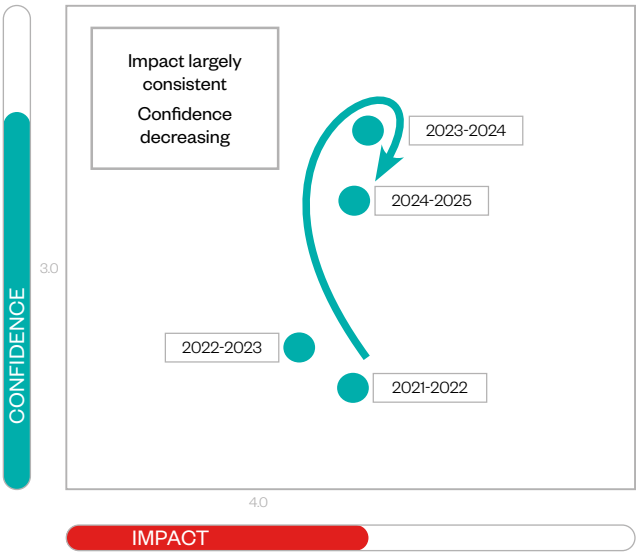
Public funding ranked the second highest in impact and lowest in confidence, signalling a continued lack of confidence in government support. Private funding also entered as a top risk factor, just behind public funding, although with slightly higher confidence than seen last year. The availability and need for private financing is clearly a top priority for business leaders, particularly in lieu of support or progress with public funding as a result of shifting government positions.

Market-based measures ranked as this year's highest confidence factor and its second lowest impact level so far, bar its measurement in the ICS Barometer's first year. This could point to rising confidence in the progress being made at the IMO – which appears justified by the outcome of MEPC 83. That said, shifts in the current US Administration's approach could impact the outcome at MEPC ES and ongoing confidence. The Maritime Just Transition considerations ranked as the lowest impact with middle confidence levels, followed closely by consumer pressure as the second lowest impact.

Interestingly, while still in the top five impact factors, crewing and skill concerns have seen a reduction in impact to operations along with a slight rise in confidence. This could be down to more training programmes and safety information around future fuels being developed, as well as progress on the Code on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) amendments and the latest meetings of the IMO Subcommittee on Human Element, Training, and Watchkeeping. It could also be a result of some countries like the US shifting sustainability investment and targets alongside a growing global emphasis on oil and gas. This could potentially also lead to other countries shifting their own commitments in order to remain competitive, affecting the pace of change.

Global industry leader's perception of key green transition issues and their impact on business operations 2024-2025

Regulations remain the biggest impact



For the fourth year in our survey, regulations tops the list of the greatest impact factors relating to decarbonisation, fuels, and emissions. It is not hard to see why - maritime is particularly regulation driven, and the regulatory landscape continues to evolve at pace.

One major example is the recent expansion of the EU emissions trading scheme (EU ETS) to cover the shipping sector. This means ship charterers, owners, and managers now need to get to grips with extra financial and administrative compliance requirements, and in some cases take on new responsibilities and design liabilities. Other recent legislative advancements, including on the Carbon Intensity Indicator (CII), the Energy Efficiency Existing Ship Index (EEXI), the Energy Efficiency Design Index (EEDI), and FuelEU Maritime, add to this ever-growing volume of compliance and administrative demands.

C-suite respondents to this year's survey also displayed high confidence to handle regulations. This 'can-do' sentiment shows that business leaders feel that they are more in tune to deal with the complexities around reporting requirements, and are more confident that they can minimise the impact to their businesses despite these risks. It could also highlight growing confidence that this year's IMO's MEPC meetings will continue to yield tangible progress on the regulatory process, granting the industry more transparency.

Additionally, we have seen some cases of government support on decarbonisation efforts emerge, including Australia's ongoing development of its Transport and Infrastructure Net Zero Roadmap and Action plan, which includes a Maritime Emissions Reduction National Action Plan, submitted to the government in 2024 for review. Other developments include the UK's Maritime decarbonisation strategy and Singapore and India signing a Letter of Intent to cooperate on maritime digitalisation and decarbonisation, amongst many others.

Given the geopolitical turmoil that is impacting the operating landscape, it is understandable that maritime leaders are cautious about the progress made – and still need clarity on what further impacts or administrative burdens might be created. As such, regulations are likely to be seen as a highly ranked impact factor until regulations are in force and being complied with.

Confidence falls in public funding

Maritime leaders have rated public funding as the second highest impact factor for the industry's green transition, making it one of the leading impact factors for the second year running. The rating is roughly the same as last year, signalling its continued importance in business sustainability plans for maritime leaders.

That said, confidence to handle this risk is at an all time low. This negative view of governments' ability to provide support for the industry's green transition, despite there being some regulatory progress, reflects a very mixed picture across the world.

Some of this low confidence could be attributed to scepticism on the part of maritime leaders that revenue raised from carbon emission management regulations, such as the EU ETS, would be reinvested in the sector in a meaningful way. Indeed, although some finance for green technology and projects can be accessed by industry via the EU Innovation Fund, much is funnelled into national budgets. A mapping of the latest global funding opportunities supporting zero-emission and energy efficient ships by Mission Innovation shows a total of 72 schemes in existence. Of those, five are public-private partnerships and 28 are provided by National Governments, and are a mix of loans, grants and subsidies, incentives, guarantees and tax incentives. Though some are broader decarbonisation schemes, covering more than one sector, maritime-specific funding accounts for only 14 of the 72. The majority are issued by European governments. These numbers are not high and make the pool of public funding fairly limited for maritime.

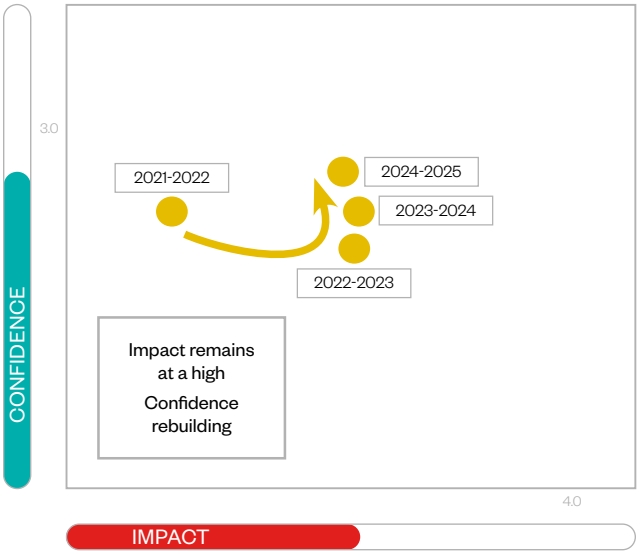
Green bonds and climate transition finance are on the rise, with the European Investment Bank (EIB) surpassing the EUR100-billion mark late last year in total issuance of Climate Awareness Bonds and Sustainability Awareness Bonds. However, this may not be sufficient to finance decarbonisation on the required scale.

Analysis by the European Commission (EC) shows that between 2011 and 2020 EUR764 billion was invested into the EU each year to reduce greenhouse gas emissions. This equates to about 5.1% of the EU's GDP as calculated in 2023. However, to reach its 2030 decarbonisation target, the Commission estimates an additional EUR477 billion will be needed each year. The EC states the transport sector requires the most investment to decarbonise by 2030: EUR754 billion a year – far short of current investments.

Maritime leaders' lack of confidence could be explained by growing concerns that some governments may dial down funding on decarbonisation efforts, particularly given the renewed attention on oil and gas, and shifts with the current US Administration. Although BloombergNEF's Energy Transition Investment Trends 2025 stipulates that investment in the energy transition is higher than ever, growing 11% to hit a record USD2.1 trillion in 2024, current sentiment could undercut this trend. Furthermore, the pace of growth for energy transition technologies was slower than the previous three years. It is of note that China invested and drove the majority of the growth, eclipsing the US, the EU, and the UK.

Despite the slowdown, many regions continue to make announcements, such as the UK's latest round of Clean Maritime Demonstration Competition to establish zero-emission shipping routes between the UK, Netherlands, Norway, Denmark, and Ireland.

Confidence in private funding on the rise



Private funding has entered the top impact risks for the first year, sitting at number three behind regulations and public funding. However, this increase was only slight when compared to its ranking over the other three years of ICS Barometer data – and was accompanied by minor growth in confidence.

Private funding is seen as critical to filling in climate change finance gaps alongside greater public sector and multilateral development bank action. There are models of success emerging – such as Standard Chartered's first ship-based transition loan for the Chinese market, which was granted to CCB Leasing and could explain the increased confidence.

However, critics believe that more must be done with great urgency. According to the World Economic Forum, developing countries will need USD2-4 trillion annually to avert catastrophic climate change, making private capital at scale critical. The International Energy Agency echoes the need for the private sector to play a greater role, estimating that it will need to stump up around 70% of climate finance globally, with the rest coming from the public sector. Last year's COP29 in Baku, Azerbaijan, saw delegates highlighting the importance of the private sector in mobilising the

trillions of dollars needed for the world's transition to a low-carbon economy and in building resilience to climate physical risks.

Unfortunately, private climate finance investments have been slow to materialise.

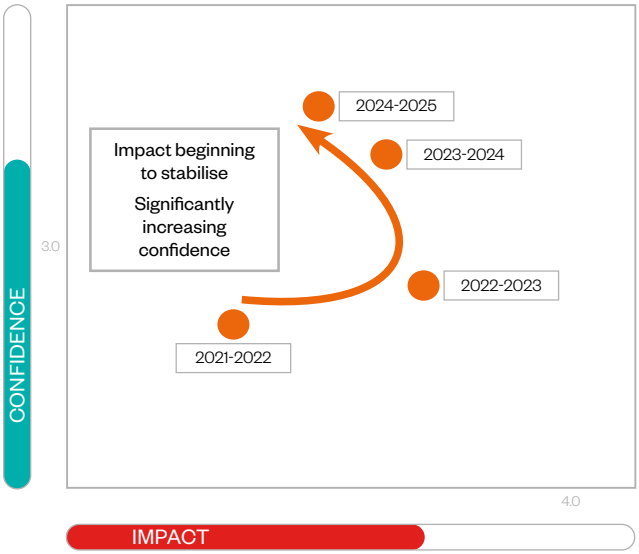
While maritime leader's confidence in securing this funding has increased, S&P Global Sustainable data shows that only about one-fifth of financial institutions have identified business opportunities related to climate change. Better financial data, strong project pipelines, and a robust integration of climate into financial risk assessments and the development of carbon markets with high-quality standards, could make a major difference in attracting heftier private investment.

The rise in confidence to handle private funding as a risk could point to C-suite leaders having more faith in the evolving regulatory landscape, such as how the Emissions Trading System is going to transpire, or more standardised assessment criteria generally. Conflicting regulations, however, particularly in areas that have seen pushback in climate change policy, could raise a question around whether we will see a surge in interest for fossil fuels.

Geopolitics has an important role to play here. According to Deloitte, US policies could potentially drive a notable shift in supply chain strategy by prioritising reshoring while disrupting recent nearshoring and global sourcing trends. The full implications of these policy changes are yet to materialise, but many investors are exercising caution. That said, new markets could emerge, with Asia primed to step into any power vacuums. The World Economic Forum states that while the US remains essential, its role as the default growth engine is evolving and that despite the recent trade tensions, Asia remains a vital economic engine. ASEAN countries, India, and the Middle East are also fast becoming a prime target for companies looking to re-align their innovation roadmaps and go-to-market strategies.

> Only one-fifth of financial institutions have identified business opportunities related to climate change

Strong confidence for market-based measures



Market-based measures sit at the highest confidence levels for any impact factor assessed in this year's survey, and the second lowest impact level (bar 2021-2022).

This signals confidence at the time leaders took the survey in progress being made at the IMO. Due to the major impact new market-based measures will have on maritime businesses it sits in the top five impacts for this year.

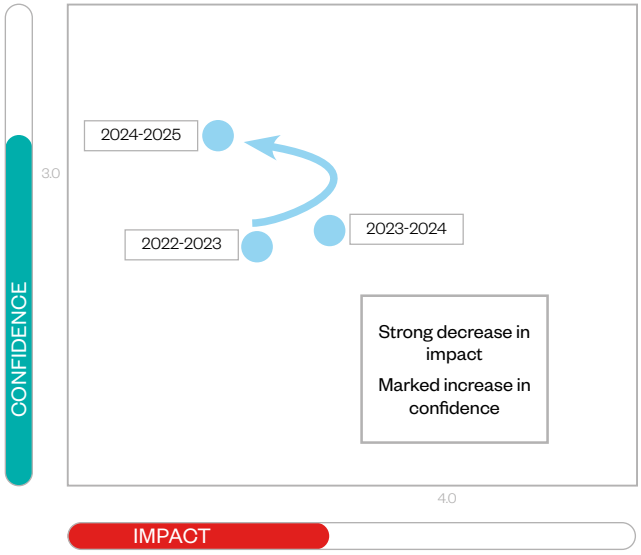
Confidence will have been bolstered by progress seen at the 17th meeting of the Intersessional Working Group on Reduction of Greenhouse Gas (GHG) Emissions from Ships (ISWG-GHG 17) and MEPC 82 in September 2024 to push forward and refine the text for mid-term GHG reduction measures. This included "an economic element" such as a maritime GHG emissions pricing mechanism.

The IMO Net Zero Framework was agreed at MEPC 83 in April 2025. Set to be formally adopted in October 2025 and enter into force in 2027, the historic agreement sets out a mandatory marine fuel standard, mandated, progressive reductions to GHG emissions intensity, and GHG emissions pricing. A mandatory USD100 charge for every tonne of carbon dioxide emitted above an annual greenhouse gas fuel intensity (GFI) threshold will go into an IMO Net-Zero fund established to reward those adopting low-emission technologies, for research and infrastructure and just

transition work and to mitigate the negative impacts on Small Island Developing States and Least Developed Countries. More efficient vessels will be able to sell credits to those with higher emissions.

While there are concerns that the agreement does not go far enough, it is an important step in reducing emissions and, it is hoped, will provide both shipping and fuel providers with incentives to unlock major investments required to achieve these decarbonisation goals. Much will hinge on what occurs during the MEPC extraordinary session in October, where a two-thirds majority vote from governments will be required to formally adopt the Net-Zero Framework.

Availability of crew and trained personnel sees rise in confidence



While still in the top five impacts, crewing and skill concerns have seen a reduction in perceived impact to operations and strong rise in confidence over the past three years. The high confidence and low impact of this factor likely stems from multiple factors, including uncertainty over outcomes on market-based measures aimed at accelerating a transition to low and zero carbon fuels. Following the US Administration's decision to pull out of the Paris Climate Agreement, there may also be a perception that the global adoption of green fuels may slow down, reducing the urgency to train crew. Many governments have responded to the scale of the training and recruitment needs, with countries like Germany, the UK, Japan the Philippines and more making progress.

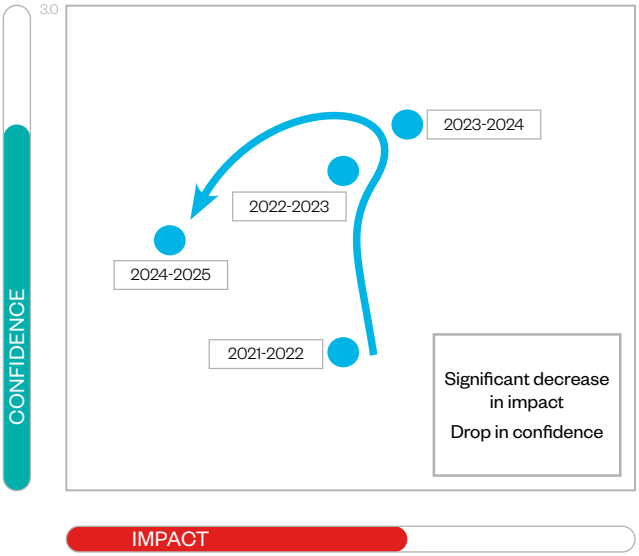
The boost in confidence may reflect the wealth of training programmes, guidelines and safety information developed for future fuels in recent years, alongside ongoing progress at the IMO. From IACS unified requirements and guidelines from Class NK, and training institutions, crews and shipowners have access to trusted safety and training resources.

That said, there are calls for greater action. The Maritime Just Transition Task Force study carried out by DNV has warned that 800,000 seafarers may need to be trained or upskilled by the mid-2030s. Some leaders are already experiencing skills shortages in trained crew for LNG and LPG ships. In June 2023, at the Shaping the Future of Shipping: Seafarer 2050 summit, Marcos Jr. of the Philippines called for cross sectoral support to increase employment retention. Maritime leaders should also be mindful of declines in crew happiness and impacts to recruitment and retention (see regulations risk section).

Meanwhile, just before this year's survey closed, the IMO's Sub-Committee on Human Element, Training and Watchkeeping (HTW) agreed on draft generic guidelines for training seafarers working on ships powered by alternative fuels and new technologies, set for approval in June 2025. While the wider STCW review continues until 2027, the IMO, via its Sub Committee on Carriage of Cargoes and Containers (CCC) has also developed 'high-level goal-based' interim guidelines for ammonia-fuelled ships, is finalising hydrogen fuel guidelines (due September 2025), and is revising those for methyl/ethyl alcohol fuels, though inclusion into the IGF code is not expected until 2027.

> Boosts in confidence may reflect the wealth of training programmes, guidelines and safety information developed for future fuels in recent years

Stranded assets reach lowest impact level



Stranded assets are not seen as a major impact to business operations – although confidence in dealing with this issue is on the wane. The low impact assessment of this factor could be linked to the fact that many maritime leaders have been holding off on large scale investments in future-fuel vessels and engines – and this strategy appears to have paid off given ongoing geopolitical uncertainty.

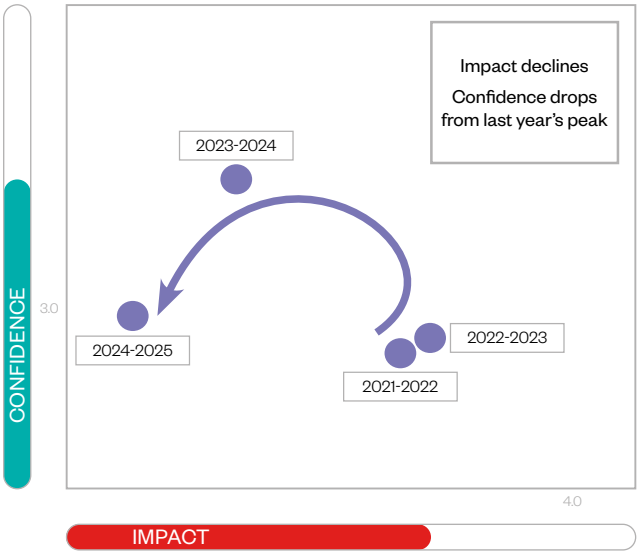
Shifts in the US Administration's energy policy has reinvigorated natural gas and oil exploration and led to temporary pauses on its green new deal, impacted grants and licenses for clean energy projects, and could prompt funding cuts to US battery and carbon capture projects. Further, some major energy companies have scaled back lower-carbon energy investments or recommitted to fossil fuels. To remain competitive and ensure fuel availability, other nations and industries may delay or reduce sustainability plans, making stranded assets less pressing for now.

Owners are favouring dual fuel vessels that operate on LNG (widely available and with well-known operating procedures), while also being ready for alternative fuels. Strong market signals came from Maersk's July 2024 order of at least 12 dual-fuel LNG vessels, despite earlier opting for methanol. Clarksons' 2024 data shows LNG dual fuel technology accounting for 70% of alternative fuelled tonnage ordered, up from 43% in 2023 (see LNG fuel section). A fifth of all orders are 'ready' for future fuels, with ammonia and methanol the most prominent choices.

Leaders' low confidence in handling the impact of stranded assets reflects a broader trend of caution, with shipowners extending vessel lifespans and retrofitting new and more efficient technology and engines, rather than recycling, amid regulatory and investment uncertainties. Other contributing factors include regulatory shifts, such as the CII, which is driving efficiency investments, and a strong second-hand market. Shipowners are exploring ways for existing vessels to meet 2030 decarbonisation targets. DNV notes operational and technical energy-efficiency measures (like new coatings and insights from operational data analysis) can reduce fuel consumption by 4% to 16% by 2030.

Warranting attention is a study from the University of College London (UCL) Energy's Institute, which outlined the fact that lenders are providing cheaper loans to greener shipping companies but not greener ships themselves. As carbon intensity is not accounted for in long term loans, shipping banks run the risk of premature write-downs or stranded assets if stricter climate mitigation measures are enforced nationally or internationally.

Investor requirements – confidence drops but impact is low



Confidence in investor requirements is down from last year's four-year high, when clarity within the industry and a greater focus on formalising Environmental, Social, Governance (ESG) guidelines meant maritime leaders believed they were equipped to meet investor

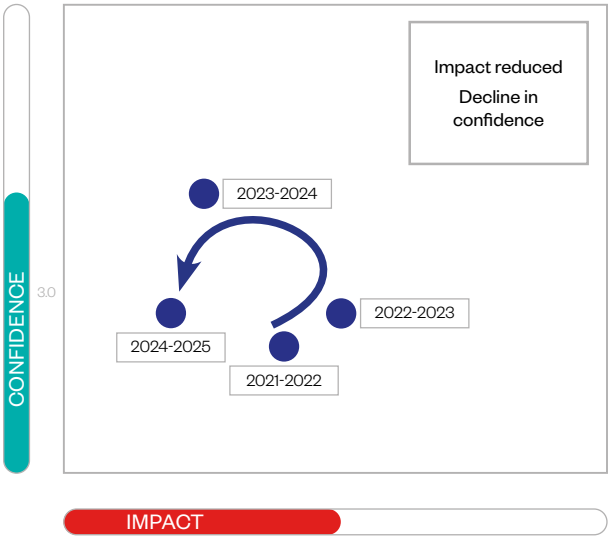
expectations. However, with investors beginning to demand greater clarity on ESG data, and sustainable investment funds wary of the possibilities of greenwashing, and likely even more cautious after major carbon tax scandals, confidence levels have almost fallen to the lows recorded in the two years before last.

Maritime leaders might be concerned that third-party ESG data providers only offer fairly simplistic sustainability scores to investors. Additionally, in 2024, investment in emerging green technologies, including clean shipping, reached only $155 billion, an overall drop of 23% year-on-year, according to a report from BloombergNEF. This declining investment was attributed to issues around affordability, technology maturity, and commercial scalability and might also explain the industry's lack of confidence when it comes to investor requirements.

A lack of clarity on market-based measures and green fuel technology specifications from IMO may also play into maritime leaders' thought patterns, as many are walking the line between investing in environmental considerations and maintaining their competitive edge. Given the threat of a potential recession many operators may feel that investors would be less demanding of green technologies and more focused on the bottom line, accounting for the record low this year in the perceived impact of investor requirements. Indeed, data from Deloitte has previously found just 5% of total global funding directed to shipping is based on ESG indicators, underlining the relatively low impact of investor requirements.

> Industry sentiment may be at odds with ongoing consumer and political focus for greater transparency [on sustainability]

Confidence down on consumer pressure but impact low



Consumer pressure is viewed as the second least impactful element of the green transition. While consumers have a powerful voice, there have recently been some failings in climate litigation around the misleading of consumers, which may have contributed to the idea that consumer pressure won't significantly impact operations. This includes a state judge dismissing a lawsuit by New York City, which sought to demonstrate that ExxonMobil, Shell, BP and the American Petroleum Institute had deceived consumers about the climate impact of their fossil fuel products.

Equally, the current US government's decreased focus on ESG considerations, which have spurred similar actions by private entities, could play a part in maritime leaders believing consumer pressure will prove less impactful. Maritime leaders may also be hoping that increasing use of low carbon fuels alongside wind and shore power, as well as boosting fuel efficiencies would insulate the sector against criticism by consumers. Despite this, confidence levels are down from the heights of last year.

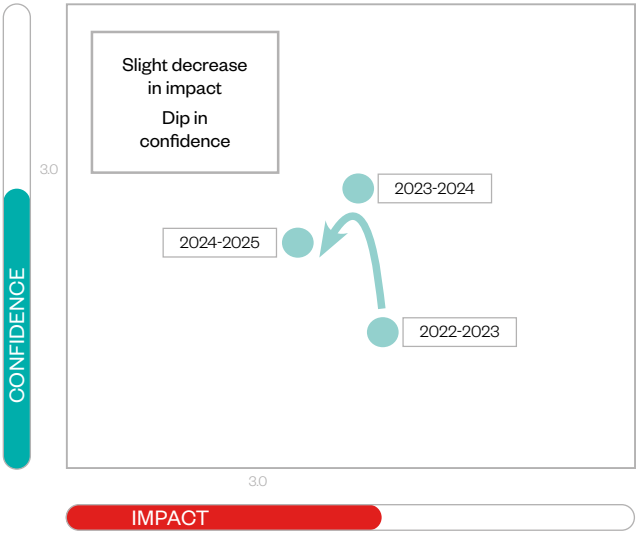
However, industry sentiment may be at odds with ongoing consumer and political focus for greater transparency and a push for evidence of sustainability claims, even in light of economic hardships reducing a desire in some customers for more costly sustainable services or products. Europe and Asia have largely avoided anti-ESG sentiment impacting investments and the EU's Corporate Sustainability Reporting Directive (CSRD) is creating more stringent and transparent reporting requirements for industries including shipping.

There is also greater consumer and political scrutiny over greenwashing, with lawsuits against major companies put forward in New York, South Korea, and South Africa in 2024. Investors also see greenwashing as an increasing risk, with 85% calling it a growing problem in a 2024 survey of global investment decision makers.

New greenwashing laws have been instigated by various governments – clearly it is an issue popular with voters. The EU's 'Empowering Consumers Directive' bans false claims such as "biodegradable" and "climate neutral". Meanwhile, Canada has bolstered its consumer rules in June 2024 to require testing to verify claims about a product's environmental or social benefits.

With major businesses including Amazon, IKEA and Unilever signing up to a pledge to only move cargo on ships using zero-carbon fuel by 2040, it seems that consumer pressure is still shaping the behaviour of the world's largest corporations and this in turn poses a challenge for the shipping industry to meet. Equally, public attacks on shipping such as the Extinction Rebellion group blocking cruise ships from docking at ports highlight negative sentiment towards the sector. The last such demonstrations were in September 2024. Coupled with the legal costs and reputational risks of climate litigation, consumer pressure cannot be dismissed entirely.

Just Transition viewed as least urgent factor



The maritime 'Just Transition' – which refers to a people-centered approach to greening the economy by focusing on fairness, inclusivity and good jobs – is viewed as the least urgent of the industry's green transition issues, with middling confidence levels when it comes to responding. Impact levels have been largely consistent over the last three years, although is seen as the lowest it's ever been.

> Shipping appears to be confident in its ability to deal with issues around equity in transition and upskilling crews

Shipping appears to be confident in its ability to deal with issues around equity in transition and upskilling crews, which could in part be down to a clear action plan set in place by the Maritime Just Transition Task Force, which spans labour standards, gender and diversity, health and safety, skills and training, alongside recruitment and attrition. The plan also highlights three key priority areas: developing a baseline decarbonisation training framework for seafarers; developing a comprehensive global recruitment and retention strategy for the maritime industry; and developing pilot projects and a blueprint to serve as a template for national-level advisory bodies to advise on training, skills, and other policy areas, as necessary.

The consistent confidence on display may be the result of the industry rolling out seafarer training on methanol, ammonia, hydrogen and other future fuels, as well as updated training regarding emissions reporting for bridging fuels such as LNG and biofuels. Classification societies have also published guidance on vessels using low carbon fuels, clarifying requirements for safe operations.

Provided that maritime leaders continue to invest in training by competent individuals and provide decent work opportunities, the industry is better-positioned to manage this factor. However, public and private funding in training – particularly in existing and emerging seafarer supply nations – is vital to maintain momentum.

SECTION 3

Fuels and Technologies

Fuels and technologies

In 2024–2025, the availability of low and zero carbon fuels was the most significant factor impacting investment in these fuels. For the first time in four years, the question of fuel availability has overtaken the need for infrastructure to deliver low and zero emission fuels in port as a top priority, reflecting growing urgency around scaling up supply to meet industry demand within a reasonable time frame.

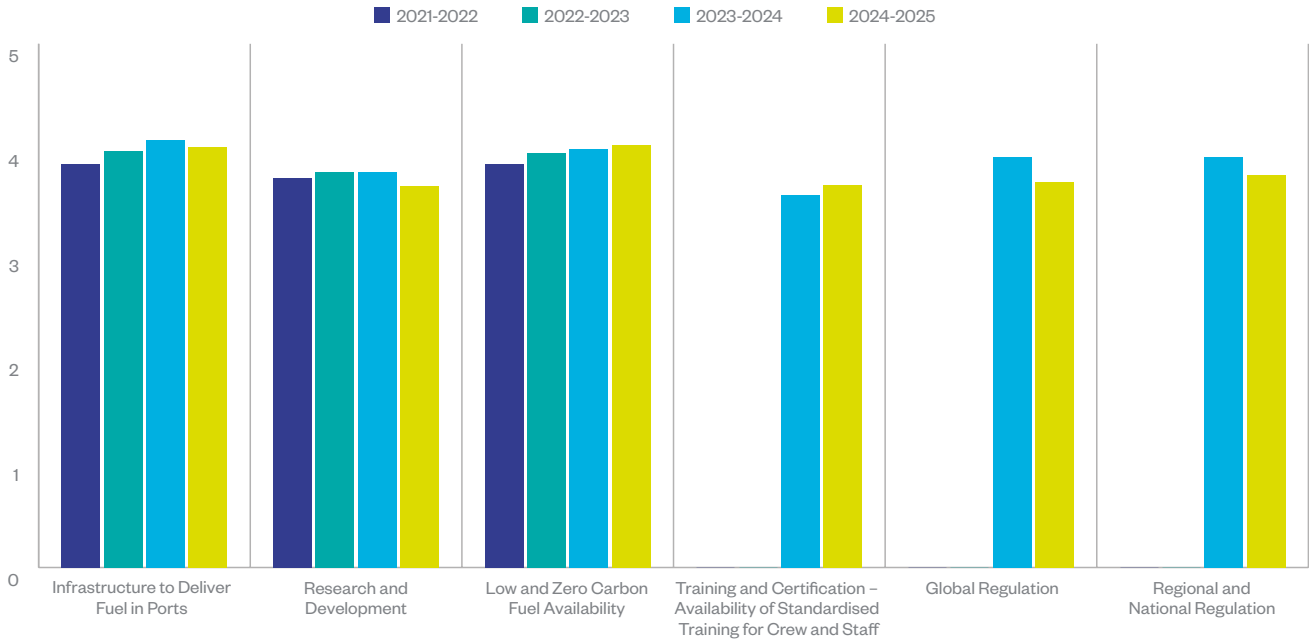
Shipping has become more engaged in pursuing the collaborations required to ensure fuels will be made available and at the required volumes – therefore likely better understands the challenges and necessity of fuel availability. Vital cross-sectoral, public-private platforms involving ports, like the Clean Energy Marine Hubs, intend to de-risk investments needed to produce low and zero emission fuels to be transported to the maritime sector.

Part of this rise in concern over fuel availability could be due to concerns over the US Administration's tariffs on China and a potential negative effect on the country's strong electrolysers manufacturing industry. The technology is key to the production of low and near-zero fuels such as hydrogen. China currently accounts for more than 40% of global financial investment decisions for electrolysis manufacturing projects. It remains to be seen whether US tariffs imposed on China will impact this market.

Equally, shifting political attitudes from countries such as the US, which has announced a return to greater oil exploration, will likely have influenced concerns over investments in zero carbon technologies and fuels. There may be expectations of a ripple out effect from the US Administration's decision, where other governments follow suit and reduce investments in alternative fuels. Major energy companies have also turned away from renewable energy development. This could have major economic impacts, with import and export patterns shifting to meet the increased oil production and meeting the demand for lower cost fossil fuels (compared to new alternative fuels), making investments in new fuel infrastructure a lower priority. Data from the IEA shows that investment in fuel supply remains largely dominated by fossil fuels in 2024. However, there is still major investment in clean energy globally, with the IEA reporting that in 2024 global investment in clean energy technologies and infrastructure reached USD$2 trillion.

Insights from the latest survey show a steady climb in the perceived impact of low and zero carbon fuel availability from a weighted score of 3.85 in 2021-2022

Year-on-year impact on company decisions to invest in zero carbon technologies and fuel



to 4.03 in 2024-2025, whereas the infrastructure to deliver these fuels in ports saw a temporary peak last year (4.08 in 2023-2024) before a dip to 4.01 this year.

Regulation remains a key driver of progress on decarbonisation, but this year regional and national rules edged out global frameworks in importance (3.75 vs. 3.68). The 2024-2025 ICS Maritime Barometer survey split these factors – previously recorded as 'global and regional regulation' in 2023-2024 – to reveal sharper insights into pressure points driving shipping's financial decision-making. The prioritised focus on regional and national regulation is likely the result of fragmented policy on addressing maritime emissions – such as the US focus on energy security via fossil fuels in contrast to a drive for alternative fuels in the EU – leaving shipping's globalised supply chains in flux.

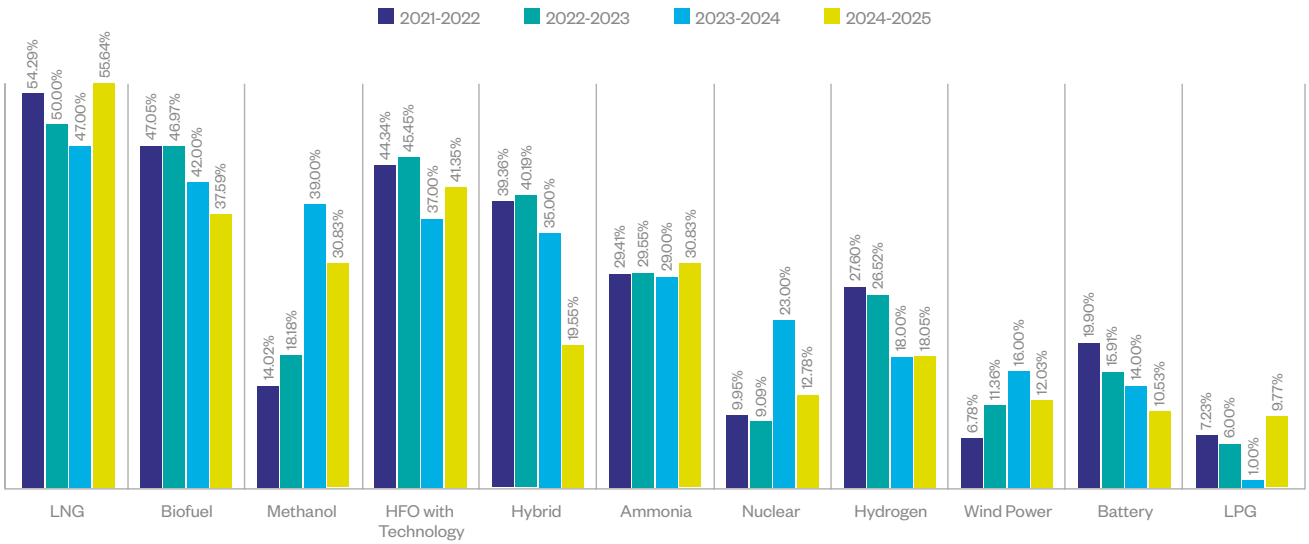
Reflecting wider market trends, maritime leaders have shifted away from green fuels and towards traditional fossil fuels, pulling in the opposite direction from previous sentiment. Liquid natural gas (LNG) and heavy fuel oil (HFO), which had both declined in last year's survey, increased this year and dominated the results, with LNG topping the survey, followed closely by HFO. Meanwhile, other new fuel types, including biofuel, methanol, nuclear, wind power, and battery, all saw their viability rankings fall.

This trend is likely to be a strong indicator of an expected recession, with the market becoming more price focused and seeking stability and predictability in an increasingly volatile marketplace. With political uncertainty and economic volatility continuing, and a growing chorus of business leaders and global economists predicting a recession, this desire to stick with what is more known could prevail for the foreseeable future.

Adding a new dimension to this, however, was the recent outcome of the MEPC 83 meeting in London, which saw approval of the world's first global pricing mechanism for greenhouse gas emissions (GHG) from international shipping. The regulation, if formally adopted at the forthcoming MEPC meeting in October, will also provide a mechanism that encourages the use of zero and near-zero fuels and energy sources. With a global pricing mechanism which includes a levy on ships' GHG emissions, it is expected to shake up the market with more decisive moves on zero and near-zero GHG fuels, like green ammonia.

It is of note that, as of the time of this report, the current US Administration had issued stop-work orders for the scientists who engage in the US Global Change Research Program and the National Oceanic and Atmospheric Administration, who engage with a key working group of the Intergovernmental Panel on Climate Change (IPCC). As this shift in research and funding plays out, the low carbon landscape is likely to undergo further change.

Global maritime leaders' perception of the fuels and technologies that will be the most viable in the next decade



LNG dominates viable future fuels list

Maritime leaders' choice of LNG as the most viable fuel for the next 10 years – with HFO placed second – almost certainly reflects a desire for more predictability and stability. As the world becomes increasingly volatile, with talk of a global recession and stock market fluctuations, traditional fuels bring a sense of familiarity and thus are perceived more risk averse. The infrastructure surrounding them already exists and is well established, while cost is also more consistent and reliable.

Drewry expects LNG to be feasible as a marine fuel until at least 2035, amidst the EU Emissions Trading System (EU ETS) and the FuelEU Maritime. The recent move by Maersk deferring its methanol-powered ship orders in favour of LNG-fuelled container vessels also hints that shipping companies are increasingly circumventing alternative fuels and instead considering LNG.

Compounding this has been a slowdown in green methanol production due to high processing costs, the absence of economies of scale, and technological bottlenecks. This has made commitments to the green-methanol supply into the market by 2025 seem overpromising, leading to slower-than-expected growth. Drewry further reports that Maersk's pivot to traditional fuels could create a butterfly effect in the industry, with other companies potentially following suit. This is echoed in the current global orderbook, which shows 560 LNG-fuelled vessels on order, adding over 1,100 LNG-fuelled vessels to be in service by 2029.

The draw towards traditional fuels could also be in alignment with shifting energy markets and government policy. The 15th annual Banking on Climate Chaos (BOCC) report found that in the seven years that the Paris Agreement was adopted, 60 of the world's largest private banks financed fossil fuels with over USD6.9 trillion. Nearly half – USD3.3 trillion – went towards fossil fuel expansion.

Countries such as the US are returning to greater investment in fossil fuels, opening large swaths of federal land to drilling in order to maximise oil and gas production. However, it is worth noting there is some doubt over how effective the US Administration's desire to steer away from zero and near-zero GHG fuels will be in the face of consumer pressure and market demand for greener fuels. Costs for many of those technologies continue to fall, companies are still under pressure to deal with climate change, and many US states are reaping economic benefits from new factories and power plants.

Major energy firms such as BP are also increasing oil exploration. In April 2025, BP announced a significant oil discovery at its Far South prospect in the deepwater Gulf of Mexico (known as Gulf of America in the United States). This discovery not only reinforces the energy giant's push to expand offshore production in the US, but could help further stabilise cost, which goes hand in hand with greater exploration.

Expanding LNG bunkering operations could also be driving up demand. SEA-LNG's 2024 annual report 'View from the Bridge' highlighted a significant expansion of LNG bunkering infrastructure in 2024, with 198 ports worldwide and an additional 78 ports planning to introduce bunkering facilities. At the same time, the number of LNG bunkering vessels also rose by 22%.

As zero and near-zero GHG fuels are currently more expensive, with investments still being made on new infrastructure and biofuel engines, it will take stronger government support to stabilise the cost gap and lure the industry away from traditional fuels. This will also send strong signals to the market to increase confidence in the viability of green fuels, thereby encouraging investment.

Steady technological progress is also being made in some areas. The IMO is working hard to drive the advancement of regulatory frameworks and support the adoption of innovative technologies, such as onboard carbon capture and storage (OCCS) and CO_2 sequestration. These initiatives, led by the Intersessional Working Group on Greenhouse Gases (ISWG-GHG) and other IMO bodies, have been described as critical elements in addressing the shipping sector's environmental footprint and ensuring IMO's climate goals for 2050 are met. Carbon capture and storage on board vessels is now a possibility, as seen by the world's inaugural floating platform for production, storage, and offloading (FPSO) in Shanghai, China.

> As the world becomes increasingly volatile... traditional fuels bring a sense of familiarity

Meanwhile, the first two LNG-powered, wind-assisted CO2 transportation ships for the Northern Lights project, a joint venture (JV) of energy majors Shell, Equinor, and TotalEnergies, have also launched. These ships combine LNG-powered propulsion with wind-assisted technology and air lubrication, and boast a 34% lower carbon footprint compared to conventional ships running on marine fuel.

In some respects, LNG has decreased in appeal to investors. It remains an area of controversy in the decarbonisation debate, with a case before the European Commission on whether or not LNG can be termed as a green fuel. LNG will also not be compliant with FuelEU as time goes by because, even with emission reduction technology, it is unlikely to stay on track past 2035's 14.5% reduction target.

Resurgent HFO takes second place

The resurgence of HFO as a viable fuel over the next decade is perhaps a bit more surprising. When asked how long the shipping industry will still require access to fossil fuels in an even longer time frame, most (42.86%) noted it would be required for the mid-term (16-25 years), up from 36% in 2023-2024. Meanwhile, 23.31% said this access would be needed in the long-term (26-35 years), the same as last year's findings, while 13.53% opted for the very long-term (36-45 years), a drop from 19% in the previous year's survey. Those feeling they still need immediate access to fossil fuels sits at 6%, down by just over 7% last year, and short term (6-15 years) at 13.53%, on par with 2023-2024 data.

HFO, traditionally a low-cost fuel derived from the residuals of crude oil refining, has slowly declined in usage since 2020 due to environmental regulations and pressure from decarbonisation efforts, including the IMO's 2020 sulphur limits and more recently the agency's outright ban of HFO in Arctic waters in 2021.

> More than 42% of maritime leaders noted HFO would be required for the mid-term (16-25 years)

However, the HFO Arctic ban has been met with widespread upset over perceived loopholes. Under the IMO regulation, the five nations on the Arctic coastline are allowed to issue waivers as well as exemptions for certain ships that comply with a specific fuel tank design. A 2019 study by the International Council on Clean Transportation asserts that 22% of the Arctic fleet would be exempt from the HFO ban due to fuel tank designs, while a further 53% would be eligible for a waiver – with just a quarter of the fleet needing to explore other options.

Maritime leaders' attraction to HFO could reflect the fact that it still remains widely in use by ships equipped with scrubbers that remain compliant with IMO 2020 sulphur limits. Adding appeal is its low cost, which is typically 20 to 30% cheaper than cleaner marine fuels like MGO or VLSFO. It also offers a high energy output per tonne, making it efficient in terms of storage volume, which will be particularly important at a time of more market volatility and recession fears. HFO is also still widely available globally, although expectations are that it will gradually decline in use as decarbonisation efforts progress.

Biofuel declines despite expected demand growth

Biofuel has steadily declined in its ranking as a viable alternative fuel over the four years of ICS Barometer, with this year seeing its steepest drop. However, it remains near the top ranking in third place, behind only LNG and HFO.

Biofuels are widely considered very viable as they can often be used as 'drop-in' fuels without major engine modifications and can be blended with existing fuel types. However, the steady decline in maritime leaders' view of biofuels as a viable option over the next decade could in part be due to concerns over predicted feedstock supply limitations and the challenges that increasing global food shortages, amid rising demand from other industries including aviation, could pose to fuel suppliers. Additionally, technological limitations and the inability to achieve cost-effective upscaling present further obstacles.

Despite these challenges, global demand for biofuels is expected to accelerate. The IEA Renewable Market Report 2024 says that bioenergy, including liquid, gaseous, and solid fuels, will account for the vast majority (95%) of renewable fuel growth to 2030. To-date, more than 80 countries have liquid biofuel policies.

The IEA also projects that the share of biofuels in total liquid fuel transport demand will jump from 5.6% in 2023 to 6.4% in 2030 (on a volume basis) to reach 215 billion litres a year by 2030. This growth will be concentrated in the US, Europe, Brazil, Indonesia, and India, which together account for 85%. Globally, road biofuel demand is expected to grow by 27 billion litres (0.8 EJ) and aviation and maritime fuel use will increase by nearly 9 billion litres (0.3 EJ).

The 2030 projection for biofuel demand suggests that over 75% of it will be driven by the aviation and shipping industries. This is due to a projected 30% increase in their average annual consumption between 2023 and 2030, necessary to meet targets set by North America, Europe, and Japan. This growth is further supported by an overall increase in aviation and maritime fuel demand to 2030.

The world's leading oil and gas companies are increasing their investments in biofuels as part of their broader energy transition strategies. Major companies such as BP, Chevron, Shell, TotalEnergies, ExxonMobil, and Eni are incorporating biofuels into their portfolios, with a total of 43 biofuel projects that are either already operational or are targeted to start up by 2030, according to Rystad Energy's research. Argus analysis of marine biodiesel sales reveals a mixed picture towards the end of 2024. Demand fell in the Q4 in the port of Rotterdam by 13.8%, and just under 50% in October and December, when compared to the previous year. The Fuel EU Maritime regulation entering into force in January 2025, however, may increase biodiesel blend demand.

In contrast, there was a 62% increase over the same three-month period for marine biodiesel blends in Singapore, where prices are more competitive. Similarly, Maersk is expanding its fuel portfolio with a focus on methanol and plans to renew its fleet with between 50 and 60 vessels with dual fuel methane propulsion.

However, to meet international climate goals, the International Renewable Energy Agency projects that a five-fold increase in biofuel production capacity will be needed by 2050. Along with this, strong policy support for innovative feedstocks and technologies will be required to ensure deployment and market growth, especially as competition for biomass resources increases. It is likely that high costs and concerns over production, alongside strong competition with other transport sectors such as aviation, are helping to make biofuels a less popular choice for maritime leaders.

Methanol dips, but remains popular

While methanol has dropped in viability for maritime leaders since last year, it is one of the strongest choices for alternative fuels, sitting at the same level as ammonia.

This pattern aligns with order book statistics. According to Clarksons, methanol orders declined to a 14% share in 2024, a fall from 30% in 2023. Yet it remains one of the prominent choices for vessels ordered that are 'ready' for alternative fuels, with 320 on order. However, port infrastructure investments and availability of green fuels continue to lag. Currently only 35 ports have methanol bunkering available and planned.

A drop in viability from last year could also be down to a ripple out effect from Maersk's update to its fleet renewal plans, which had previously seen a big focus on methanol, but has since been altered to include a mix of methanol and LNG-capable propulsion systems.

Methanol is generally viewed as quicker to market than alternative fuel thanks to existing global infrastructure, although prices will likely remain a point of contention for many as it can cost up to 15 times more than diesel fuel (in part due to its lower density). Supply risks for methanol are limited by the availability of grey methanol and on-the-market dual-fuel methanol marine engines. Renewable methanol capacity is predicted to be between 7-14 million tonnes by 2030.

While safety concerns include toxicity, its low flashpoint and corrosive properties, IMO interim guidelines on the use of methanol as a marine fuel exist. As does guidance from Classification Societies. High profile projects like the 2023 joint venture between methanol producer Proman and Stena Bulk have proven the viability of methanol as a marine fuel, along with strong commitments from major container vessels operators, including ONE at the start of 2024. Wärtsilä and the Maritime and Port Authority of Singapore's Wavelink Maritime Institute have also partnered to create a simulation model to help enhance safety and operation efficiency for methanol-powered vessels.

Ammonia edges closer to reality

Ammonia also saw its ranking increase as a viable future fuel, tying with methanol as one of the top fuels. It is worth noting that this survey question did not specify 'green' ammonia, and so the data could reflect sentiment on any ammonia type currently available on the market. Regardless, there has been much progress with ammonia's emergence as a viable zero-GHG fuel in maritime shipping. Recent breakthroughs include successful ship-to-ship ammonia transfers, innovations in ammonia-fuelled engine technology, and the establishment of training programmes.

At the Port of Rotterdam, tests are underway for the port's capabilities for future ammonia bunkering operations, which are expected to begin as soon as 2026 or 2027. Meanwhile in Singapore, its Maritime Port Authority (MPA) will finalise ammonia bunkering standards for the island nation in 2025 and two potential consortia have been selected to develop and operate an ammonia power generation and bunkering pilot on Jurong Island. It will feature a 60MW, direct ammonia-fed gas turbine, linked to a 100,000 ton ammonia bunkering facility.

MAN Energy Solutions' ammonia dual-fuel engine project is also on track to deliver its pilot ammonia-fuel engine for Eastern Pacific Shipping VLAC in the first quarter of 2026. The 'ME-LGIA' liquid gas injection ammonia engine has been under development since 2020. The engine maker predicts that a third of shipping will eventually run on ammonia after tests show a 90% CO_2 equivalent reduction. Class societies ABS and DNV, meanwhile, are advancing an innovative project to develop a shipboard ammonia-cracking technology, that will help realise the vision of a zero-emission dry bulk carrier for the copper industry.

But in order to fully realise ammonia's potential and reap the benefits, more planning, technical expertise, training, and collaboration is needed. DNV's recent white paper, 'Safe introduction of alternative fuels: Focus on ammonia and hydrogen as ship fuels', stipulates that both hydrogen and ammonia have properties that introduce new safety risks, while a lack of regulations for ships running on these fuels remains a barrier to their widespread adoption. This was echoed by the Lloyd's Register Maritime Decarbonisation Hub, which recently published information on the training requirements for ammonia as a fuel, highlighting the need for new safety measures and standards.

Doubts remain on hydrogen's viability

Hydrogen has had a near 10% fall in viability since the 2021-2022 survey, currently sitting below major winner LNG, as well as the more popular choices of HFO with technology, biofuels, ammonia, methanol and hybrid propulsion technology. The steady decline in maritime leaders' belief that hydrogen is a viable fuel choice over the coming decade is likely due to continued technical and safety challenges around storage, handling, its low flashpoint and the possibilities of leaks.

The fuel's low energy density will be another consideration, especially for leaders banking on more traditional fuels like LNG or HFO. High costs, unproven hydrogen technology – much still at RD&D stages – and nascent bunkering infrastructure globally are all likely to contribute towards falling confidence in this fuel's prevalence in the market over the next decade.

There are few planned hydrogen bunkering projects, although key developments are being made in key ports in Europe and Asia. The Port of Rotterdam authority aims to make Rotterdam a hydrogen hub, and is working with various partners to create a 'large scale hydrogen network' across the port. Singapore's Maritime Port Authority (MPA) released a call for expression of interest for interested parties to develop low or zero-carbon power generation and bunkering solutions in Jurong Island, with a key focus on hydrogen.

Perceptions on hydrogen's viability are also impacted by regional variations. As per last years' report, Japan has implemented a strategic focus on hydrogen across various sectors including transport and steel manufacturing, with an approximate investment of USD 98.8 billion over the next 15 years.

According to the latest data from the IEA, global hydrogen demand increased by 2.5% in 2024 compared to 2022.

> IEA data shows global hydrogen demand increased by 2.5% in 2024 compared to 2022. Low-emissions hydrogen plays a small role

However, low-emissions hydrogen plays a small role, with production at less than 1 megatonne (Mt) in 2023. Current predictions suggest this could increase to 49Mt per annum by 2030, based on announced projects. This has been driven by strong growth in electrolysis projects – crucial for producing green hydrogen. Though China is strengthening its leadership for electrolyser manufacturing globally accounting for more than 40% of global financial investment decisions (FIDs) for electrolysis manufacturing projects, ongoing trade wars impacting Chinese goods could impact that market in the future.

Sentiment blows cold for wind power

A dip in wind power's ranking as a viable fuel in the next decade is surprising considering the market for wind is strong. Over the course of 2024, there were 54 large ships in operation with wind propulsion and seven more designated as wind ready. Wind propulsion technologies are already commercially available, and investments would be futureproofed against any incoming environmental regulation. Additionally, advancing technology, fuel savings and the economic benefits of complying with current and future regulation is prompting rapid uptake of wind-assisted propulsion systems, according to a DNV report.

One possibility is that high upfront costs and a lack of regulatory clarity is holding back confidence in wind propulsion, with the IMO yet to define specific regulations or guidelines on the use of the technology on ships. This is down to a pending decision on whether wind power is to be regarded as fuel saving/emissions saving technology or power generating (therefore sitting alongside energy). Ultimately, views on wind power are likely to be market dependent, with the likes of India and most South American countries less likely to take up wind energy until it becomes a more mainstream option.

Battery powers down despite global efforts

Despite the decline in maritime leaders rating battery power as a viable fuel for the next decade, there have been global efforts to drive this technology forward. There are currently 944 battery-powered ships in operation around the world with a further 451 are under construction and set to be in operation within the next four years, according to a report from the Faraday Institution. There is also evidence of significant investment in battery

power in parts of Asia, including a 460-foot battery tanker in Japan that is set to transport renewable energy by 2026. Of course, current battery technology is more applicable to coastal vessels that operate across short distances or have frequent access to charging points. Viability is reduced for deep sea vessels due to concerns over charging needs, exacerbated by more extreme/unpredictable weather conditions, and the valuable space the batteries would take up, due to greater energy requirements for longer journeys.

Meanwhile, in response to the industry's 2050 carbon neutral target, a significant portion of ports around the world have signed shore power declarations to 'deploy shore-side electricity by 2028 where possible', including all large North Sea ports, Los Angeles, Montreal and all large Japanese ports. Cruise and container vessels are the primary target for most ports' regulations and the EU will start taxing vessels via the EU Emissions Trading System (EU ETS) from next year onwards.

The drive towards lower emissions is prompting investment and research into coastal operations, which would likely offer a viable solution for the longer term given that batteries can be powered by the likes of wind and solar energy. Additionally, grid greening goals will drive investment and lower ship-based vibrations in port will appeal to local communities.

However, battery power has not reached a point where it will be viable in deep sea shipping, which could have contributed to its drop in rating. Battery technology also takes up valuable space on board, requires charging time and lacks charging infrastructure. Owners might also feel the same 'range anxiety' that has previously slowed adoption of electric cars – there could be risks if ships need to be re-routed or hit storms and batteries power down quicker than expected.

Ensuring viability will require predictability of routes and multiple nearby charging stations. Ultimately, as appetite increases for HFO/LNG, there may be a decreased desire to invest in battery technology. Instead, owners may spend money on finding alternative vessel energy efficiencies, including the use of digital tools.

LPG remains least viable

Liquefied Petroleum Gas (LPG) has been ranked as the least viable fuel for the second consecutive year of our Barometer, although it is rated as more viable than it was last year, when it received the lowest score of any fuel type over the last four years.

Because LPG is not in widespread use, there is currently limited guidance on its usage, which creates a self-fulfilling lack of adoption. Meanwhile, with LNG more readily available, the industry appears reluctant to invest in LPG, despite its compliance with global sulphur restrictions and the reduction in nitrogen oxide (NOx) emissions it offers.

Conclusion

Although ongoing geopolitical uncertainty dominates the industry's broader risk outlook for the second year running, this by no means needs to paint a completely gloomy picture. There have been many positive developments, including maritime leaders' growing confidence in their ability to handle supply chain instability. This is very far removed from the days of the COVID-19 pandemic when instability was the number one top risk issue. In fact, during and following the pandemic, shipping has made major inroads in holistic thinking and forged greater collaboration with governments and key stakeholders to ensure the global supply chain is more resilient. This must continue to keep pace with rapid changes, including decarbonisation, in the industry.

Shipping has time and time again proven its resilience in the face of repeated major incidents, from cyber-attacks, to extreme weather events, port congestion, and conflicts impacting trading routes, proving the maritime leaders remain agile and responsive.

Advancing digitalisation technology is also opening new doors, helping to streamline operations further and giving industry players the tools to react more quickly and effectively to supply chain challenges. This also opens up further opportunities for greater sharing of data and collaborations to streamline the wider supply chain with key stakeholders. Meanwhile, the increase in confidence to handle cyber security risks shows maritime leaders have a growing understanding of the issues they face, continue to build in stronger resilience and training, and are increasingly bolstered by new advancements in technologies such as AI.

Proactive and expanded recruitment efforts and programmes have also boosted confidence in crew and training personnel. This is a welcome development that the industry has long needed, and is expected to grow in the right direction with increasing support from the industry and more governments that are stepping into action.

Higher confidence in the ability to handle regulations also reflects a growing can-do sentiment despite maritime shipping facing an ever-growing volume of reporting requirements. It will be interesting to watch the outcome of the IMO's MEPC meeting this October to see how they will build on the results from MEPC 83. If delegates choose to formally adopt the IMO Net-zero Framework, there will be major implications for maritime, with greater certainties unlocked, attracting more investment opportunities. This in turn would help spur the commercialisation and infrastructure development for near-zero and zero fuels required to decarbonise the sector.

A core issue, however, will continue to be political instability. An escalation of conflict, a trade war, and a global recession are all distinct possibilities that would ripple across the maritime shipping industry. In the short-term, this could continue to make investors more reserved to make any decisions and the operating landscape more challenging. But as the climate is volatile, this too could rapidly change. This ICS Barometer will be there to track the trajectory of change and deliver the insights needed to safely guide our industry to port.

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SECTION 4

UK regional focus

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The top risks for the UK are:

- 1. Cyber-attacks (3.95)
- 2. Malicious physical attacks (3.7)
- 3. Barriers to trade (3.7)
- 4. Increasing admin burden (3.7)
- 5. Availability of crew and trained personnel (3.6)
- 6. Extreme weather events (3.6)

The United Kingdom had the largest number of participants from a single country, with 20 respondents out of a total of 133. The highest risk identified in this year's *ICS Barometer* was cyber-attacks, jumping from its third-place ranking in the previous year. The responses largely mirrored those of the global community, with malicious attacks, trade barriers, increased administrative burdens, and availability of crew and trained personnel following closely behind.

The most significant change, however, was that political instability was not among the top risks. Last year, this was the top risk, likely due to the uncertainty surrounding the anticipation of a new government and global political turmoil. While geopolitical tensions, threat of conflict, and tariffs continue to create uncertainty globally, UK-based maritime leaders perceive the political system as more stabilised than previously, likely linked to the new Labour government firmly in place providing greater certainty.

At time of writing, Ipsos data showed that polling confidence in Prime Minister Kier Starmer had risen following decisive actions surrounding shifts with the new US Administration and recent meetings with EU leaders over the Russia-Ukraine conflict. The data revealed the public's approval of Prime Minister Keir Starmer and the UK government's management of the Ukraine conflict has risen to 40%, a 6% increase from the previous month.

Regional focus: United Kingdom

This could also be because the Labour government has goals to rebuild stronger political and economic ties with the EU again. Polling data by the internationalist thinktank 'Best for Britain' indicates that a majority of voters (53%) believe that closer ties with the EU would have a positive effect on the UK economy, while only 13% believe it would have a negative effect. Furthermore, 68% of respondents believe that improved relations with the EU would result in a boost for UK-EU trade.

Confidence is likely bolstered by Labour's more stable and predictable stances and policies, when compared to a period of volatility towards the end of the former Conservative Administration, marked by a series of new prime ministers and leadership races.

This being said, the remaining top risks – cyber security, malicious physical attacks, barriers to trade, and increased administrative burdens – all have links to the government and issues taking place more widely on the global stage. These could all be signposts that there is a lack of confidence more broadly in geopolitical issues, but a higher sense of trust in the current UK government. However, given global shifts, particularly with the current US Administration, this could change in the near future.

Compared to global survey respondents, the UK ranked malicious physical attacks as a top risk, placing it second as opposed to the fifth place assigned by other respondents. This may be due to the UK's perception that the threat of global conflict has spread, making the maritime industry more vulnerable.

The risk of trade barriers tied for second place, likely due to fears of a trade war escalating from changing government approaches to tariffs and increased protectionist and isolationist economic policies. The International Trade Council reports that this trend has been driven by various factors in recent years, including economic nationalism, geopolitical tensions, and the COVID-19 pandemic's aftermath.

No continent has been spared, with countries and regions from India and Indonesia, to the US, China, Brazil, Argentina, and the EU grappling to adjust to a changing global economic environment. It is widely feared that a full-blown trade war would cause widespread disruption to global supply chains and higher prices for consumers and businesses, potentially triggering a worldwide recession.

SECTION 5

Annexe

Methodology

The ICS Maritime Barometer survey was conducted by Intent Communications Ltd, on behalf of the International Chamber of Shipping (ICS), between 6 January 2025 and 28 February 2025. The aim of the survey was to measure maritime industry leaders' evolving attitudes towards risk, resilience, future-proofing, fuels, technologies and decarbonisation.

The survey received a total of 133 complete responses from C-Suite executives representing shipowners, ship operators/managers, classification societies, trade organisations, service providers, ship builders, port authorities, the insurance sector, and law firms.

The ICS Maritime Barometer survey covers three primary topics: risk, resilience and future-proofing (consisting of 12 key points), decarbonisation, fuels and emissions (nine points), and the viability of alternative fuels (13 points).

The industry's decarbonisation goals rest significantly on the shoulders of the crew and personnel delivering these strategies and operations, and these responses will continue to be tracked and assessed in future editions of the ICS Maritime Barometer survey.

The survey examined how these topics are perceived by maritime industry leaders from different parts of the world, and maps initial assessments of fuel futures, financial imperatives and greatest risks. Responses were weighted on a five-point scale and then compared with data gathered from 221 respondents in the 2021-2022 pilot ICS Barometer survey, 132 responses in the 2022-2023 ICS Barometer survey and 104 responses in the 2023-2024 ICS Barometer survey to track trends and shifts in perception among anonymised C-suite respondents.

The survey questions have largely remained the same over the four-year period to allow for an accurate assessment of how industry leaders' views have evolved over the years. One exception is on the hybrid option for future fuels viability over the next decade in section 3 of the report, where we believed it was necessary to clarify our use of this term; a combustion engine combined with battery power. The lower confidence recorded is likely a reflection of low confidence in battery technology.

Each risk map or graph illustrates how respondents locate risk or the impact of key variables, and the confidence policymakers, CEOs and leading experts feel when addressing these issues within their area of operations.

The methodology for generating graphs involved taking the number of responses from that country and the weighting of the strength of those responses to each of the two dimensions measured (impact or risk against confidence in response). These were then mapped to indicate year-on-year trends for these factors.

Weighting was allocated as follows:

- 1 very low risk/very low impact/no confidence
- 2 low risk/ low impact/some confidence
- 3 medium risk/medium impact/reasonable confidence
- 4 high risk/high impact/high confidence
- 5 very high risk/very high impact/extreme confidence

Global and regional maps were then plotted using the X axis used to denote either risk or impact while the Y axis was used to denote perceived confidence in ability to address the relevant issues. For visual clarity and ease of interpretation, the maps are zoomed out or zoomed in depending on the range of data points, hence the corresponding shifting of the axes.

The ICS Barometer's risk maps can be used:

- For readers to ascertain where industry leaders foresee challenges and priorities.
- To follow the evolution of specific trends related to decarbonisation and fuels over the coming decade.

ICS Maritime Barometer Report 2024-2025

While the advice given in this Report has been developed using the best information available, it is intended purely as guidance to be used at the user's own risk. No responsibility is accepted by Intent Communications Ltd or by the International Chamber of Shipping or by any person, firm, corporation or organisation who or which has been in any way concerned with the furnishing of information or data, the compilation, publication or any translation, supply or sale of this Report for the accuracy of any information or advice given herein or for any omission herefrom or from any consequences whatsoever resulting directly or indirectly from compliance with or adoption of guidance contained therein even if caused by a failure to exercise reasonable care.

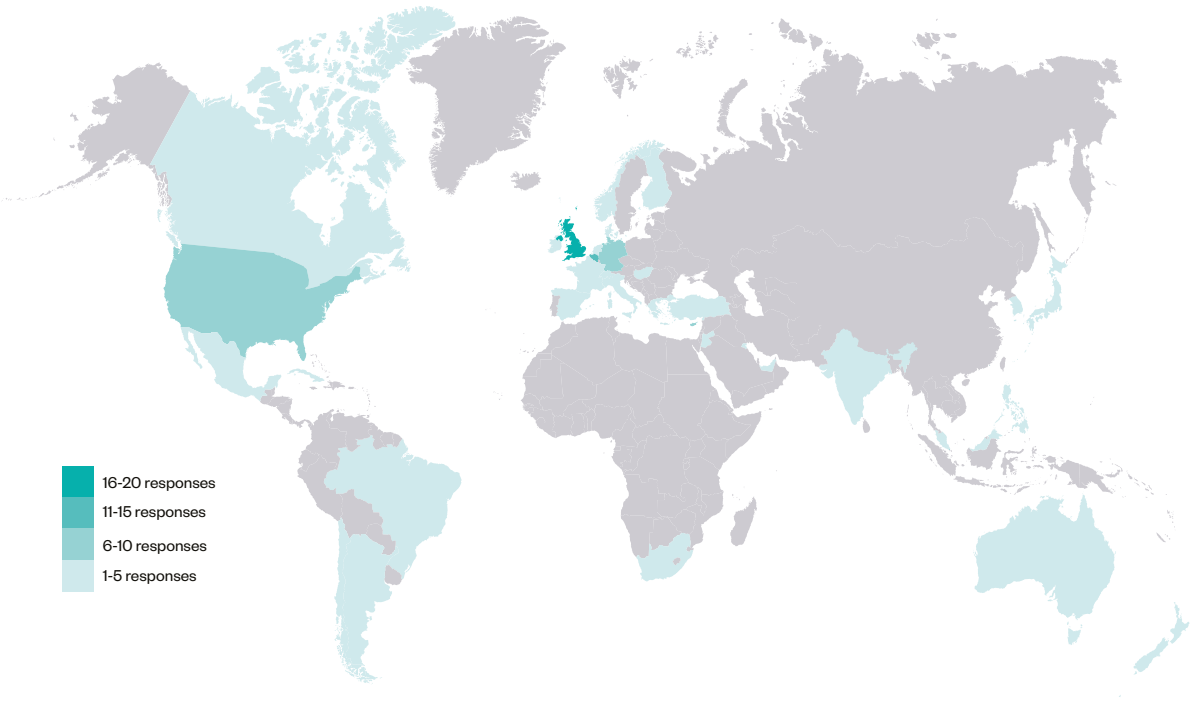
Respondents to the survey

The survey was sent to ICS National Shipowner Associations and ICS Affiliated Regional Shipowner Associations*, prominent organisations, and some individuals by email. Additional responses were solicited via a social media campaign on ICS' LinkedIn channel.

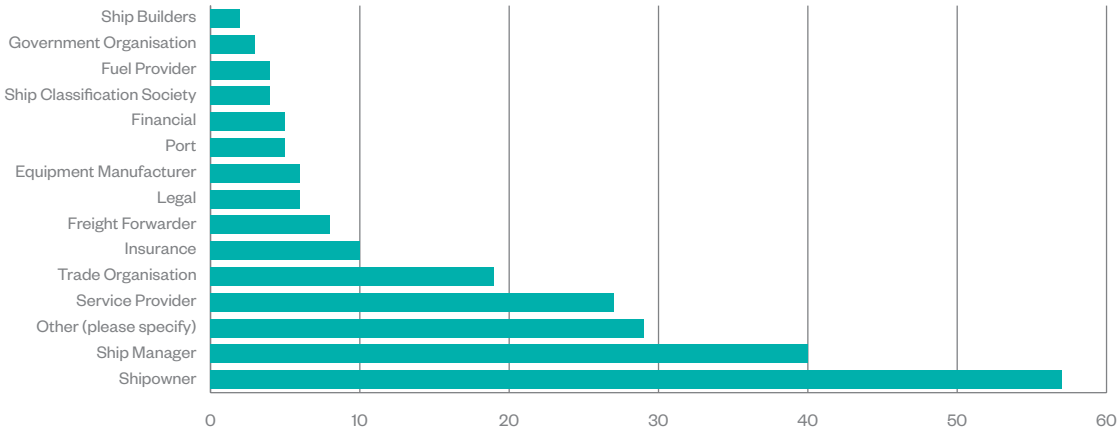
*Abu Dhabi National Tanker Company, Armateurs de France, Asian Shipowners' Association (ASA), Brazilian Association of Cabotage Owners (ABAC), Chamber of Marine Commerce (CMC), Chamber of Shipping America, Chamber of Shipping of British Columbia, China Shipowners' Association (CSA), Confederazione Italiana Armatori, Italian Shipowners' Association (CONFITARMA), Cruise Lines International Association (CLIA), Danish Shipping, European Community Shipowners' Associations (ECSA), European Dredging Association (EuDA), Filipino Shipowners' Association (FSA), Finnish Shipowners' Association, German Shipowners' Association (VDR), Ghana Chamber of Shipping, Grupo TMM, Mexico, Hong Kong Shipowners Association (HKSOA), Interferry, International Maritime Employers' Council (IMEC), Irish Chamber of Shipping, Japanese Shipowners' Association (JSA), Korea Shipowners' Association (KSA), Kuwait Oil Tanker Company, KOTC, Liberian Shipowners' Council (LSC), Luxembourg FEDIL Shipping, Malaysia Shipowners Association (MASA), Malta International Shipowners Association, Maritime Industry Australia Ltd (MIAL), Monaco Chamber of Shipping (CMS), New Zealand Shipping Federation, Nigerian Chamber of Shipping, Norwegian Shipowners' Association, Panamanian Shipowners Association (ARPA), Portuguese Shipowners' Association (AAMC), Royal Association of Netherlands Shipowners (KNVR), Russian Chamber of Shipping, Shipowners of the Faroe Islands, Shipping Australia Ltd (SAL), Singapore Shipping Association (SSA), Spanish Shipowners Association, Asociación Navieros Españoles (ANAVE), Swedish Shipowners' Association, Swiss Shipowners Association (SSA), The Bahamas Shipowners Association (BSA), The Cyprus Shipping Chamber (CSC), The Royal Belgian Shipowners' Association (RBSA), Türkiye Chamber of Shipping (TCS), UK Chamber of Shipping, Union of Greek Shipowners (UGS), United Arab Emirates Shipping Association (UAESA), and World Shipping Council (WSC).

Other bodies approached include the International Association of Ports and Harbors (IAPH), International Union of Marine Insurance (IUMI), International Association of Classification Societies (IACS), and the Central Dredging Association (CEDA).

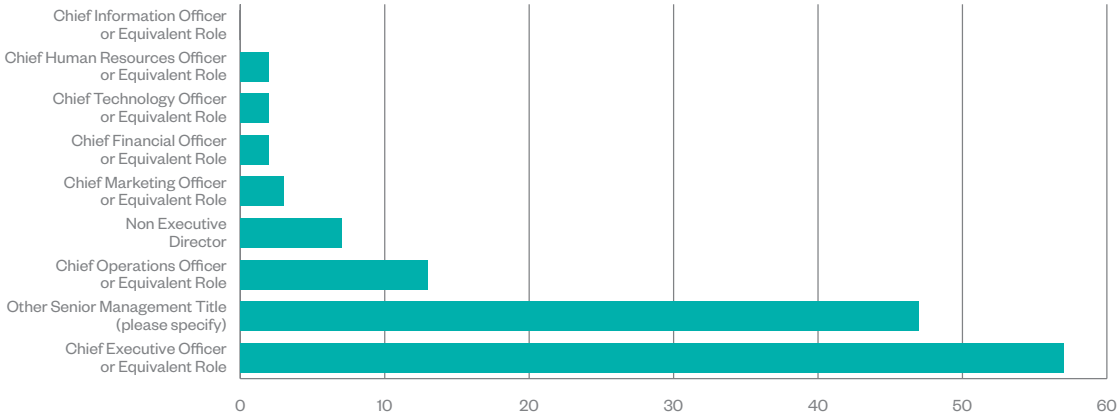
Global Responses



Maritime leaders by sector



Number of responses vs job role



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