


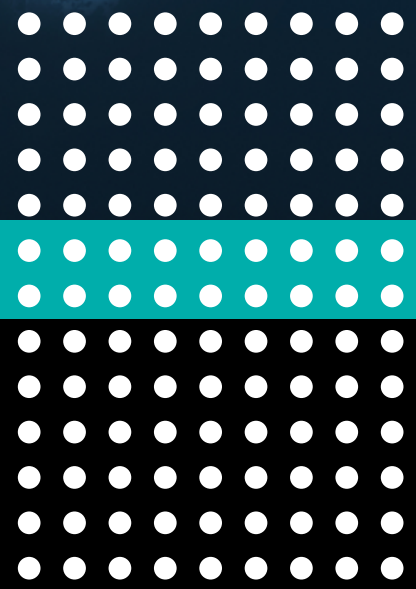


International  
Chamber of Shipping

Shaping the Future of Shipping

A close-up, low-angle shot of a large, dark metal propeller with three blades, attached to a red-painted ship's hull. The background shows the blue and white waves of the ocean, suggesting the ship is moving through the water. The lighting is dramatic, highlighting the textures of the metal and the paint.

# ICS Maritime Barometer Report 2022-2023



## Foreword

# Taking the lead

ICS Chairman, Emanuele Grimaldi



The maritime sector is navigating an extended period of rapid change as it transitions towards a greener future, while contending with increased geopolitical instability. Many maritime stakeholders are actively looking to take greener pathways to stimulate growth in their sectors as they reclaim any lost ground, but ongoing uncertainty about the routes to more environmentally friendly operations make investment extremely risky, thereby slowing the pace of much-needed progress.

The need for clear direction from our regulators and political leaders shines through in the data gathered from maritime leaders around the world for this report. Delays in government decision-making will have far-reaching consequences for the shipping industry as key choices regarding supply chain resilience, greenhouse gas (GHG) reduction measures (including carbon pricing, alternative fuel availability and the provision of new onshore bunkering infrastructure) will determine how the industry evolves over the next decade.

Make no mistake, shipping and maritime will be at the heart of many of the changes that the coming decade will bring, which is why it is imperative that we remain active participants in national and international discussions. Although our individual interests may vary, mutual understanding and collective action to leverage capabilities are the keys to a better future not just for our sector, but other sectors – and indeed, the world as a whole.

By tracking the evolving priorities of our industry's leaders, the ICS Maritime Barometer will not only serve as a vehicle for conveying expert opinions from our diverse maritime family, but also act as a compass to guide discussions with key stakeholders. It will facilitate progress in areas of alignment and identify others where a more nuanced or even new approach is better suited.

We must be vocal about our needs and ambitions so that the maritime sector is seen as a priority for support and placed on the immediate agendas of national governments and regulators. Without this action, there is no doubt that global trade – and people all over the world dependent on it – will suffer long-term consequences.

I would like to thank the 132 executives and our national member associations who have helped us identify the critical trends impacting our industry.



## Executive Summary

Over the past year, maritime has proven its ability to maintain trade despite ongoing post-pandemic challenges, and concerns have shifted towards growing global instability, as well as wider societal trends, including a greater focus on decarbonisation and sustainable business practices. Maritime leaders' assessments of risk levels for industry factors (ranging from political and supply chain instability to barriers to trade) and their confidence to manage these factors have demonstrated just how much the operating landscape has changed over the past year.

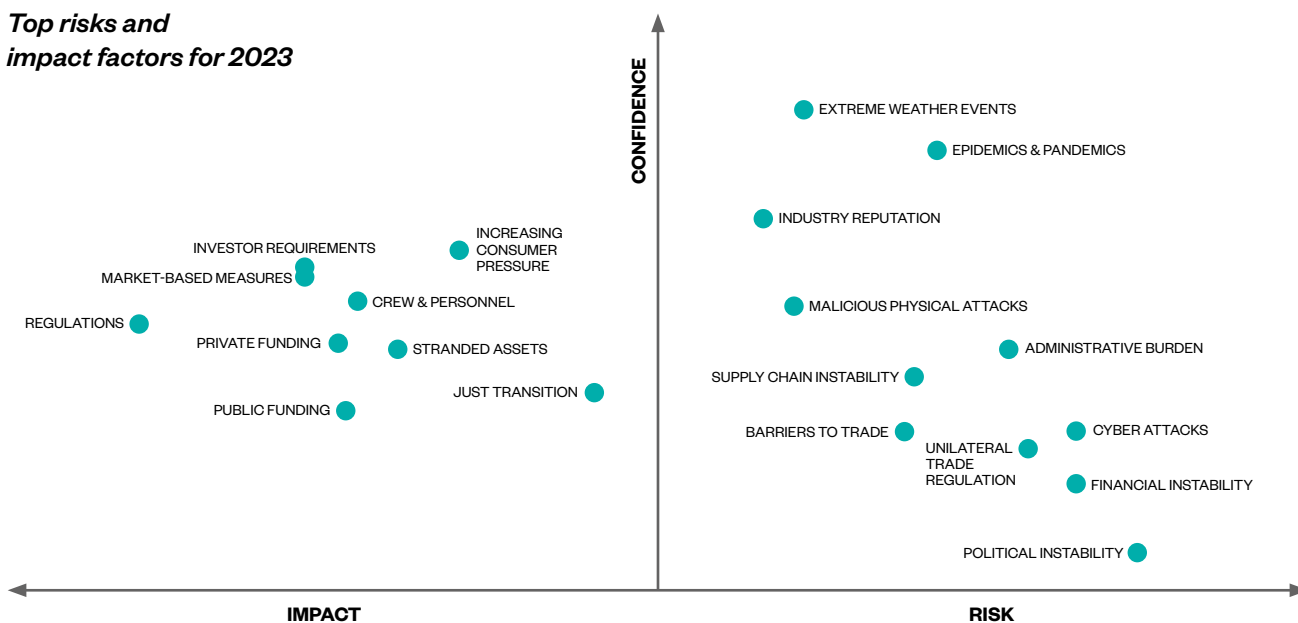
Top risks identified were political instability, financial instability and cyber-attacks – a full switch from 2021 when we undertook a pilot survey, when epidemics, supply chain fragility and trade barriers were the key concerns. As financial and political risk has risen, particularly due to the ongoing conflict in Ukraine, so too have concerns about companies' capabilities to manage such issues. A key takeaway for this year is that although some risks hold the potential to have a serious impact on operations, maritime leaders have high confidence in the industry's abilities to manage these situations. This is the case with both geopolitical and macro-economic events which though disruptive, can be handled well with adequate planning – particularly in situations where there is

sufficient information available about the impact of these events.

Respondents also shared their views on decarbonisation factors, highlighting a maturing of the industry's understanding of the complex implications of the energy transition. While the practical consequences of new GHG reduction regulations have continued to be the biggest concern for two years in a row, respondents demonstrated evolving opinions on the fuel landscape. There is also a growing awareness of environmental commitments and reputation management, which has meant that investor requirements have moved ahead of public funding as a significant concern for respondents. Meanwhile, continuing concerns about stranded assets and the lack of regulatory and technological clarity, are supplemented by concern over the potential impact of carbon pricing measures.

Emerging considerations include delivering a "Just Transition" to address maritime decarbonisation's impact on seafarers and ensure they are provided with adequate training for the use of new fuels and technologies. More generally, the availability of competent and high calibre crew is a growing issue for ship operators, especially with an expanding global fleet operating in a more fractured geopolitical landscape.

### Top risks and impact factors for 2023



### Some key risk takeaways include:

Risk posed by **unilateral or fragmented regulation** is growing but can be reduced if regulators pursue a long-term strategy to align with maritime's global regulatory framework.

A shift towards **greater protectionism** may threaten maritime trade and mitigation requires government appreciation of the significance of seaborne trade for global prosperity.

Sustained pressure on **supply chains** in recent years means ship operators are increasingly comfortable with the need for continuing investments to deliver resilient service.

The perennial challenge of **piracy war** and **cyber risks** means that **malicious threats** to vessel safety remain a prime concern.

COVID-19 may be under control but lessons learned – particularly over **seafarer welfare and essential trade** – need to be permanently integrated into corporate and government policy.

### Other key findings relating to decarbonisation include:

Availability of **alternative fuels and supply infrastructure** outweigh concerns about the status of ship technology as influencing factors in future investments.

**Nuclear power** is anticipated sooner than some may imagine, with 9% of respondents projecting that nuclear commercial vessels will be viable within the next decade.

**Wind-assisted propulsion** is growing in appeal, driven by the emergence of a wider range of demonstrable prototypes in operation from late 2022.

Fossil 'drag' remains a factor in maritime, with several respondents expressing preference for **LNG or heavy fuel oil** over the coming decade.

The digital dividends arising from COVID-19 continue to reap benefits as operators anticipate harnessing **connectivity investments** in their plans to improve energy efficiency.



## Introduction

The ICS Maritime Barometer is the first full-scale annual survey of risk and confidence among maritime leaders. More than 130 decision makers, half of them shipowners and around 35% consisting of ship managers, have provided insight into the issues preoccupying them and how they are placed to manage their impact\*.

It captures data on the following:

- What are the biggest challenges and opportunities facing the maritime sector today?
- How is the risk profile of the maritime sector evolving?
- How confident are companies in mitigating long-term and emerging issues?

The result is a 'snapshot-in-time' that highlights industry priorities and perspectives on factors that will be critical to the short-term success and long-term viability of the sector. By comparing the results with those from the pilot study in 2021, this report traces the evolution of both the risks themselves – with some concerns fading and new threats emerging – and the industry's perceived capability in handling them.

The report is divided into two main sections:

**Top risks for maritime leaders** – from political instability to industry reputation, how the C-suite views the threats and capabilities around key issues.

**Decarbonisation, fuels and emissions** – a deep dive on attitudes to the many concerns on climate dominating industry discussion, from fuel choice to funding.

The aim of this report is to present objective insight into perceived industry risk and confidence, which can be used to inform how the industry – and individual stakeholders within it – respond to key issues. As future surveys trace the evolution of risks and confidence, the ICS Maritime Barometer aims to become a valuable tracker of industry preparedness and action, showing the responsiveness of the maritime industry in the face of challenges to its business.

\*See annexe for full methodology and participant breakdown – as well as a comparative profile of the UK as the largest respondent to the survey.

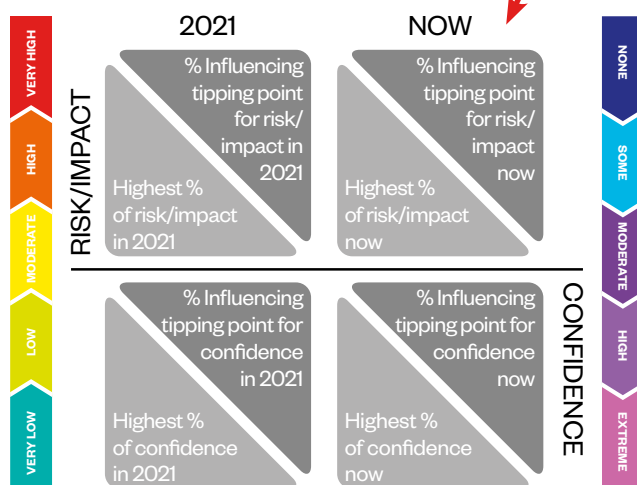


### Reading the risk/impact and confidence data infographics

For every issue, a standardised grid infographic visualises industry perception of risk/impact and confidence both in the current and previous survey, and the direction in which industry sentiment is moving.

The top two squares represent the perception of the risk/impact associated with an issue in 2021 (left hand square) and now (right hand square).

The upper right-hand triangle indicates the sentiment that is most indicative of the direction in which sentiment is evolving.



In each square, the lower left-hand triangle indicates the most widely held sentiment among respondents.

The bottom two squares represent the confidence that an issue can be handled in 2021 and now.

**For example** if the most widely-held sentiment of confidence is 'moderate' and the indicative sentiment is 'high', it indicates that the sentiment is shifting towards the 'extreme' end of the spectrum. If 'moderate' sentiment is accompanied by a 'some' indicator, it suggests sentiment is moving towards the 'none' end of the spectrum.

The percentages in each triangle represent the percentage of respondents holding the sentiment indicated by the colour of the triangle. The colour code for sentiments is as follows:



## SECTION 1

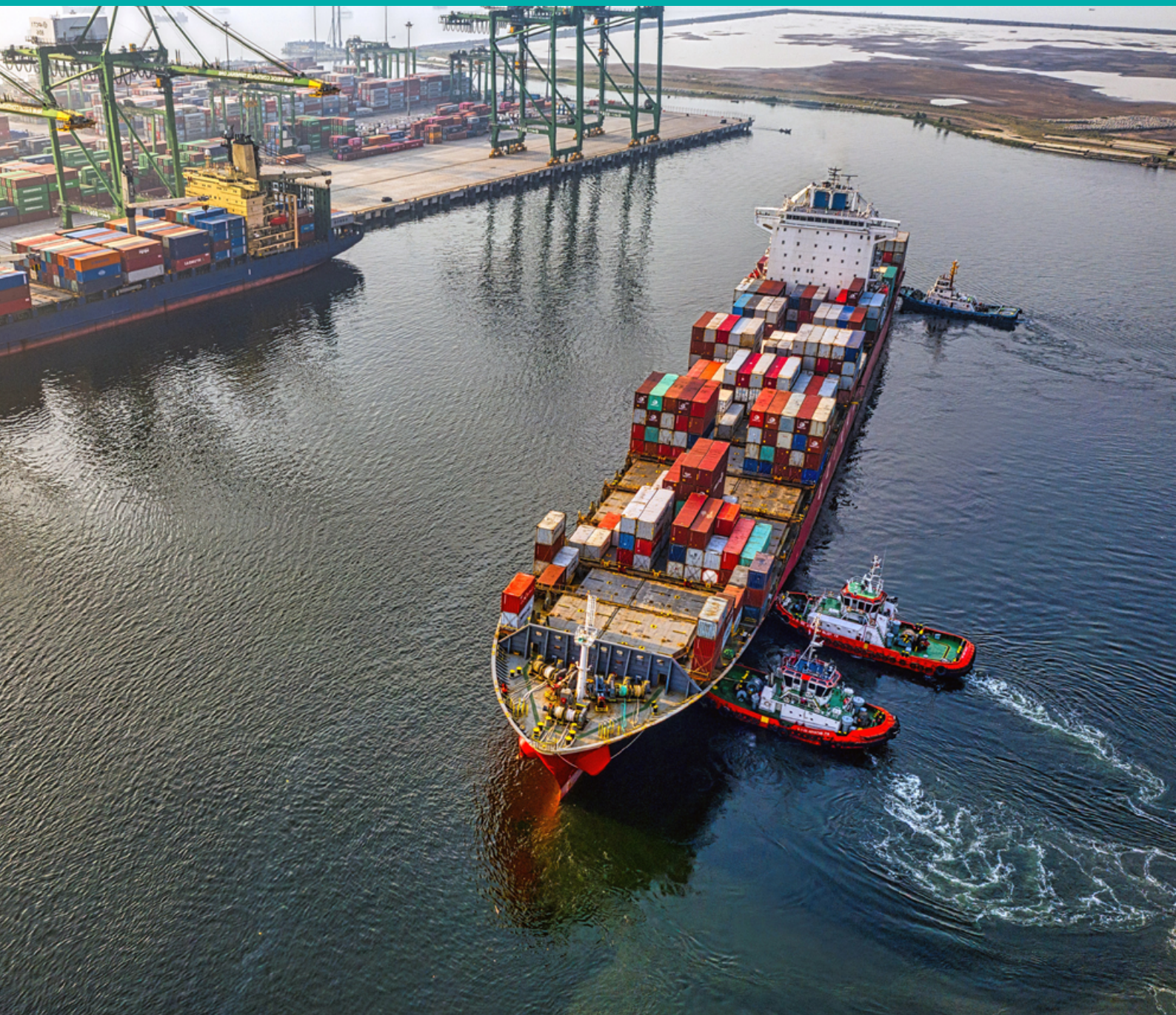
# Top risks for maritime leaders

### 2021

Epidemics and pandemics  
Supply chain instability  
Barriers to trade

### NOW

Political instability  
Financial instability  
Cyber attacks



## Overview

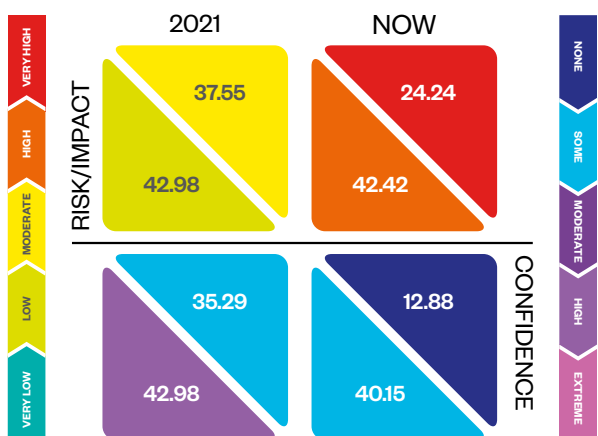
Over the past year, the maritime industry has proven its ability to maintain trade despite pandemic-related challenges, and maritime leaders' risk concerns have shifted to financial and political instability, reflecting wider societal trends. This section delves into existing risks and leaders' confidence to address these issues.

Political instability is a risk multiplier, threatening economic volatility and reduced growth as long-standing policies, trade arrangements and relationships are eroded. The results can have major consequences for trade and transport.

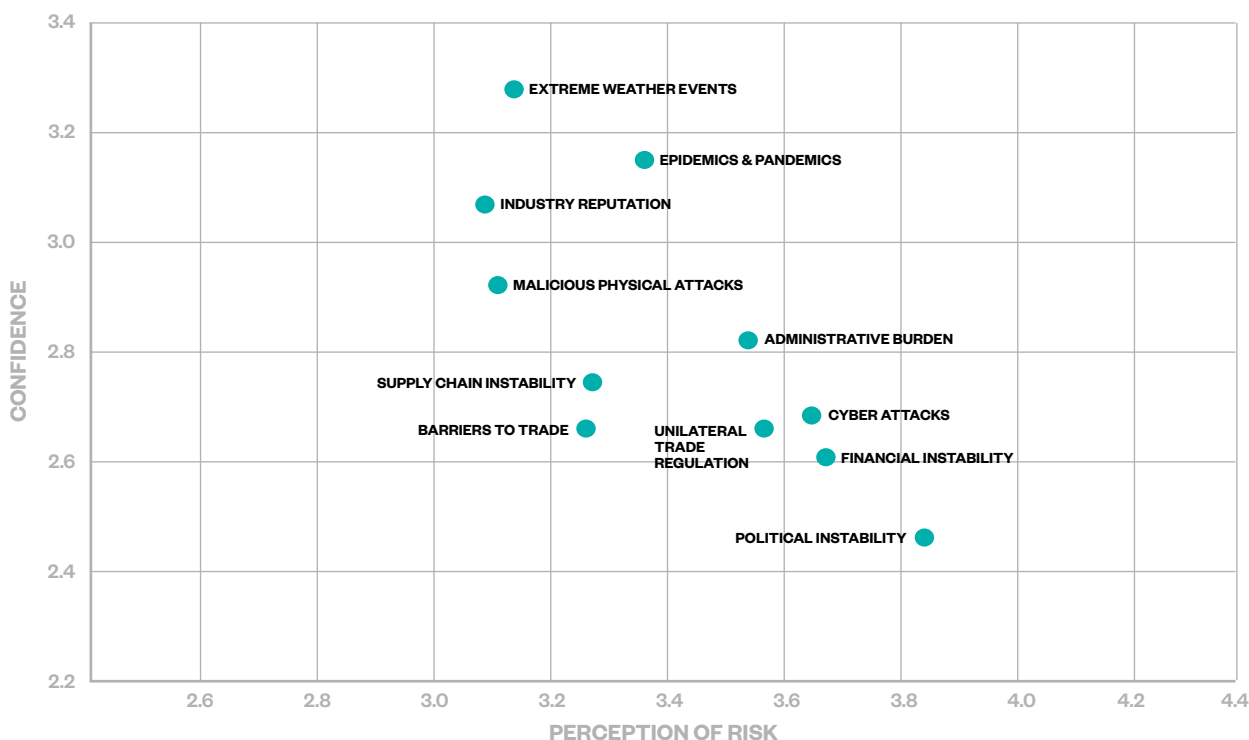
Heightened risk perception and lower confidence around political instability reflected rising unease across many regions. The impact of the conflict in Ukraine on food and energy prices was dramatic and remains a factor despite multilateral efforts to restore trade. Simmering territorial disputes in the South China Sea and ongoing instability in South Asia grew more entrenched, threatening trade in each region.

Political instability affects many aspects of maritime business including trade flows, port access and supply of seafarers. By driving waterborne migration in unsafe vessels or increasing stowaway attempts, humanitarian crises also have a direct impact on maritime safety.

## Political Instability

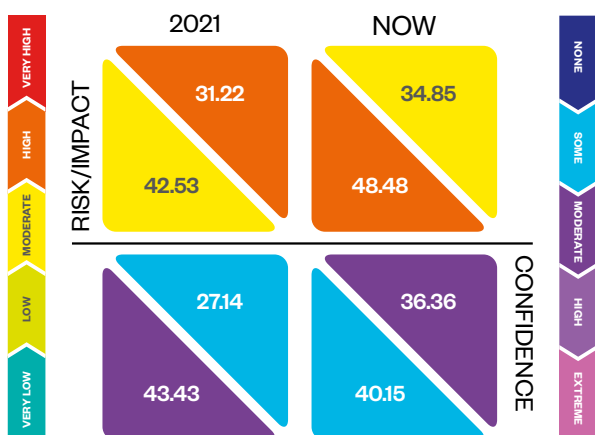


### Maritime leaders' perception of risk against shipping's ability to address this risk





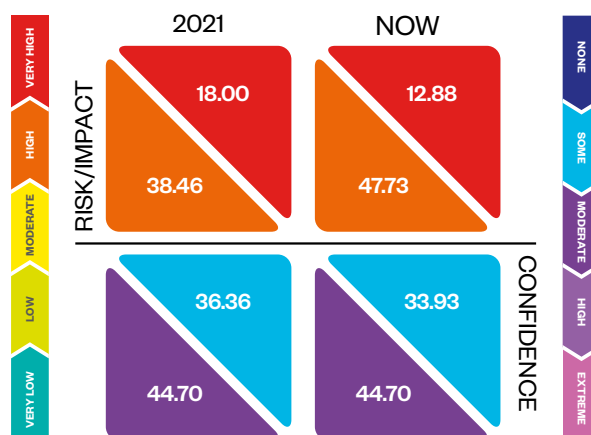
### Financial Instability



Financial instability is particularly troublesome for an industry wrestling with the expensive challenges of decarbonisation, digitalisation and supply chain resilience. Given the long list of financial issues encountered globally – including the cost-of-living crisis, high levels of public debt, potential sovereign defaults, reduced government spending, the impact of the conflict in Ukraine and the aftermath of the pandemic – it is understandable that most respondents saw increased levels of risk this year. Encouragingly, however, confidence in dealing with the consequences of instability remained high.

Given the volume of goods transported by sea, financial trends in shipping are likely to have a major impact on consumers. Although there are numerous factors that affect the price of consumer goods (including supply of said goods, import policies, and more), it would be relevant for shipping to leverage its position as the leading method of global transportation in discussions with national authorities.

### Cyber Attacks



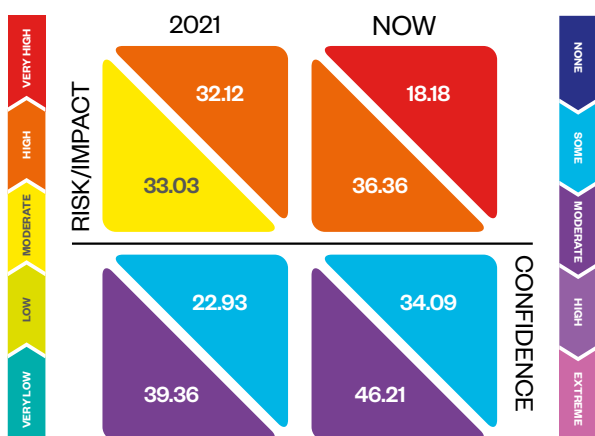
As maritime deploys digital solutions more widely, the likelihood and risk of disruptive cyber-attacks increases. Cyber incidents – including IT outages, ransomware and data breaches – were ranked as the most important risk globally in [Allianz Global Corporate & Specialty’s \(AGOS\) Risk Barometer 2022](#).

Our respondents reached a similar conclusion, with cyber threats seen as a rising risk, accompanied by decreasing confidence in maritime’s ability to mitigate the effects, perhaps reflecting growing awareness of the risks posed.

Cyber exposure will grow unless robust standards are implemented and enforced. While current IMO measures are non-mandatory, impending [IACS Unified Requirements](#) will place requirements on newbuild vessels for cybersecure systems and integration from 2024. The [ICS Guidelines for Cyber Security Onboard Ships](#) offer in-depth support for risk assessment and management of cyber risks, including advice on how to respond to and recover from incidents.



### Development of Unilateral or Regional Regulation

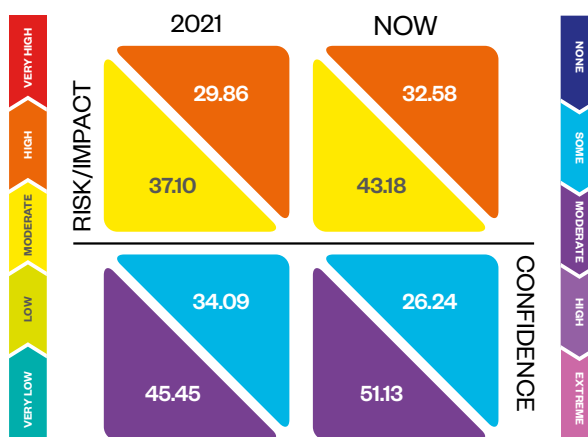


The slow pace of international regulation on environment and climate are driving up the risk of regional regulation and lowering confidence, threatening the ‘level playing field’ of the global maritime regime. [The EU’s ‘fit for 55’ plan and expansion of the EU Emissions Trading System \(ETS\)](#) to shipping is the most prominent example to date, but counterparts in the US, China and even the UK are under discussion.

A patchwork regulatory framework presents a major financial risk and potential administrative burden, and may even necessitate vessel redeployment if compliance cannot be demonstrated in a particular jurisdiction – a view reflected in the growing percentage of respondents expressing lower levels of confidence in coping with multiple regulatory frameworks.

However the EU has indicated that its regional GHG reduction measures may be revisited once a workable global regime is in place at the International Maritime Organization (IMO) that is aligned to its climate goals. If regional regulators can accommodate the need for an aligned approach, the impact of fragmented regulation on maritime can be managed.

### Barriers to Trade



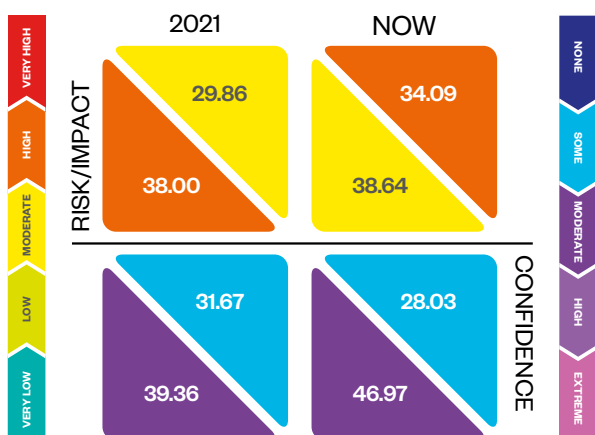
ICS’s [Protectionism in Maritime Economies Study 2022](#) outlined the trade barriers being raised by governments worldwide. The study demonstrated that removing restrictive maritime trade policies could boost GDP by as much as 3.4%.

Such barriers can represent a reaction to fears over food and energy security, as evidenced by the [protectionist policies](#) introduced by multiple governments in response to the conflict in Ukraine. In other cases, perceived strategic advantage is the goal, as with US and EU legislation last year which sought to counter the rising dominance of China in the critical market for microchips. Accordingly, respondents viewed protectionist policy as a growing risk and also indicated a reduced confidence in their ability to mitigate this.

The ICS protectionism study indicated that “relatively few countries prioritise the maritime transport sector when negotiating trade agreements”, citing low awareness of the importance of maintaining competitive and cost-efficient maritime supply chains. Much remains to be done to raise the maritime industry’s profile with governments, as an essential element of a robust and resilient global economy.



### Increasing Administrative Burden



While the biggest group of respondents switched from perceiving increased administrative burden as a high risk to a moderate risk, the total number of respondents perceiving it as a moderate or high risk grew. This rise is likely to be directly related to apprehension about the introduction of IMO's short-term decarbonisation measures and the EU's impending inclusion of shipping in its emissions trading scheme. However, confidence also shifted upwards, which may be because of longer timelines for compliance.

New regulations (and regulators) are adding stringent requirements for maritime operators, with greater expectations of evidence and reporting. The extra burden of tracking and reporting emissions, as well as the increasingly fragmented regulatory environment, mean that more maritime companies are anticipating extra work to demonstrate compliance.

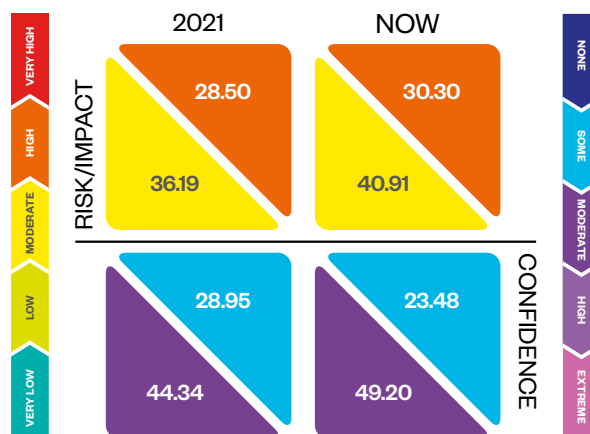
### Supply Chain Instability



A combination of pandemic restrictions, supply shortages and sanctions have hindered maritime trade over the last three years. The [UNCTAD Review of Maritime Transport 2022](#) warned that world trade remains vulnerable, presenting a long list of investments needed "to ensure maritime transport can weather the next storm". They include expanding capacity, renewing and expanding fleets and equipment, ensuring adequate and skilled labour, improving connectivity and performance, reducing GHG emissions and safeguarding competition.

Given the scale and complexity of such a task it was unsurprising that most respondents believed that supply chain instability posed a 'moderate' risk to their business, with a significant minority assessing the risk as 'high'. As the issue matures, it appears that respondents are becoming more optimistic, and the majority now hold reasonable confidence that supply chain challenges can be met.

### Malicious Physical Attacks

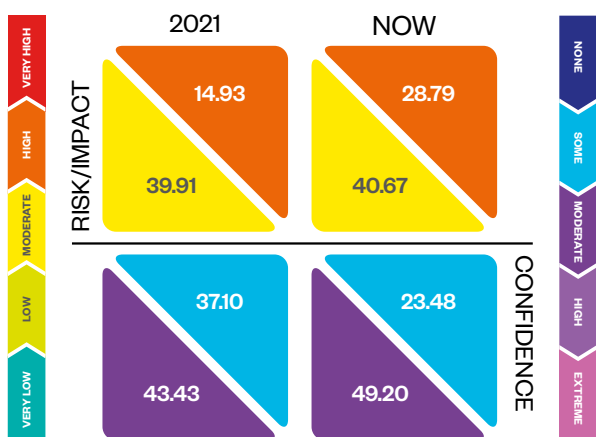


The [ICC-IMB Piracy and Armed Robbery Against Ships Report](#) noted 90 incidents of piracy worldwide in the first nine months of 2022 compared with 97 during the previous corresponding period. Despite the small decrease, the threat of serious armed attacks against ships and their crews is seen as increasing by respondents.

The ongoing conflict in Ukraine is also likely to have impacted risk perception. While most respondents are reasonably confident in their ability to manage security risks, the industry must continue to push for the protection of long-standing navigation rights, free from malicious interference.



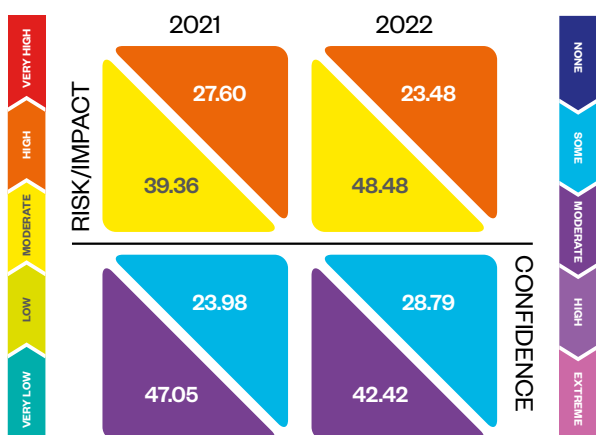
### Extreme Weather Events



Concerns about the increased likelihood of climate change-associated extreme weather events made respondents slightly less confident in their ability to deal with this risk in the longer term. Given the fact that vessels are getting larger and [creating a bigger risk profile for insurers](#), combined with the threat of port closures, vessel diversions (with related impact on emissions), blockages in the supply chain and wear and tear of infrastructure, extreme weather events are likely to have a more serious impact on company profits in future.

Although confidence largely remained 'reasonable' to 'high' this is slowly decreasing; a sure sign that forecasting and mitigating the impact of extreme weather will increasingly become a core element of maritime investment plans.

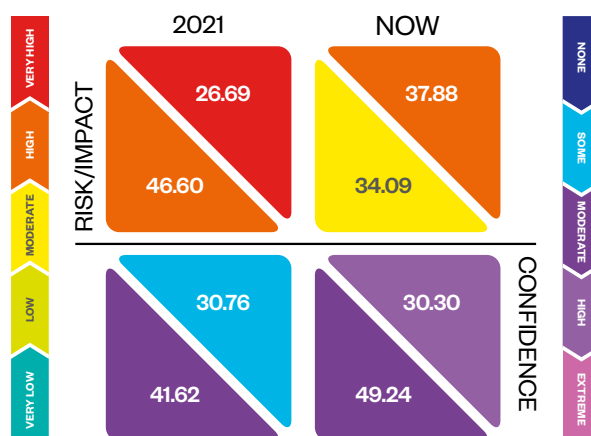
### Industry Reputation



The media focus on the supply chain over the past few years, combined with the perception that shipping is a significant GHG emitter, has created a higher risk of negative public opinion. This in turn can influence shareholder, private funding and government support, making brand reputation synonymous with short-term survival and medium-term growth.

Reputation risk perception is on the rise for respondents, with a larger majority viewing this as high risk than in the preceding year. Combined with forthcoming challenges – and the wide societal support needed to tackle them – there is a clear case for investment in careful reputation management.

### Epidemics and Pandemics



Given the relative success of maritime in coping with SARS, COVID-19 and Monkey Pox, it is not surprising that the perception of the risk posed by epidemics and pandemics was lower in this report – and industry confidence has also significantly increased.

Despite the positive attitude, it is worth remembering that seafarer rights were severely compromised during the COVID-19 pandemic. Similar situations could occur in the event of a new epidemic. Industry efforts initiated during the pandemic lockdowns must be maintained to prevent governments acting with excessive caution in future outbreaks.



## SECTION 2

# Decarbonisation, fuels and emissions

### 2021

Regulations  
Public funding  
Stranded assets

### NOW

Regulations  
Investor requirements  
Market-based measures



Shipping and land-based maritime organisations claim to be making significant progress in reducing carbon emissions – although there are concerns about the eventual results delivered from this work. New regulations such as IMO’s Energy Efficiency Existing Ship Index (EEXI), the enhanced Ship Energy Efficiency Management Plan (SEEMP), and Carbon Intensity Indicator (CII) aim to green the global fleet. At the same time new vessel designs, emerging alternative fuels, hybrid technologies and digital platforms are becoming more commonplace. In fact, the Getting to Zero Coalition’s [2022 report](#) highlighted 203 maritime projects currently underway, showing the scale of growth over the past few years.

However, uncertainty about future fuels, the status of infrastructure, access to funding, skilled human resources and lack of decisive government policy is slowing the pace of progress. According to the 2022 report ‘[Shipping’s Role in the Global Energy Transition](#)’ by the Tyndall Centre at the University of Manchester, despite a clear need for investment in production and transport infrastructure to support the global energy transition, this is being held back by weak policy support, with just 4% of current commitments actually being funded.

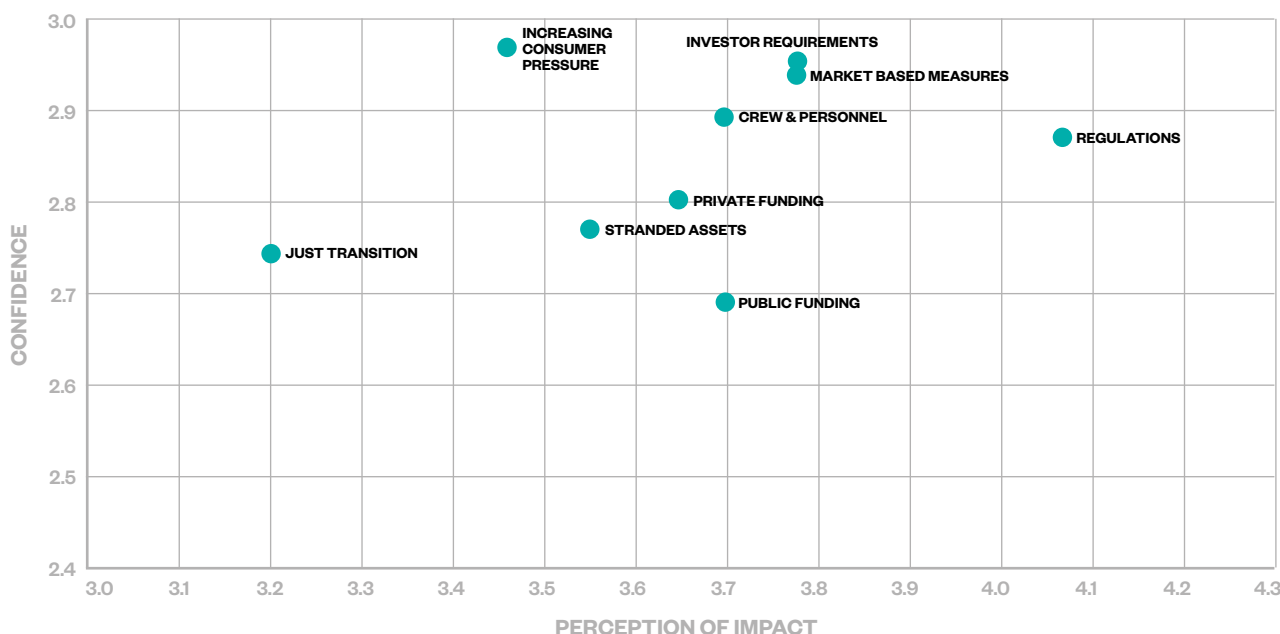
Furthermore, a [September 2022 report by the International Energy Agency](#) (IEA) notes that international shipping is not yet on track to achieve its emissions targets. It warns that total shipping emissions would need to remain flat until 2025 (despite an expected increase in shipping volumes), and decline by 3% a year thereafter to 2030 – which would result in a total decrease of over 15% from 2025 to 2030.

### Overview: An evolving perspective

Although regulations, investor requirements and carbon pricing measures were seen as high impact issues, C-Suite respondents to the survey felt significant confidence in their ability to address these issues. This could be the result of expected lengthy planning and implementation periods, allowing stakeholders a reasonable period to respond to such measures.

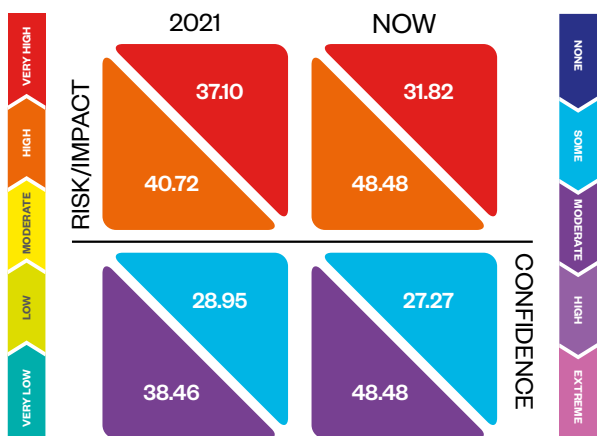
While some investor requirements have led to growing prioritisation of Environment, Social and Governance (ESG) measures, maritime industry discussion on data-gathering methodology, assessment and overview is ongoing, offering stakeholders time to plan accordingly for the future.

### Global industry leaders’ perception of key green transition issues and their impact on business operations



Although public funding and stranded assets were not among the top perceived risks, as compared to 2021, industry confidence in addressing these issues remains relatively low. This suggests that while these may not be immediate concerns, they nonetheless feature significantly on the horizon for most respondents.

### Regulations

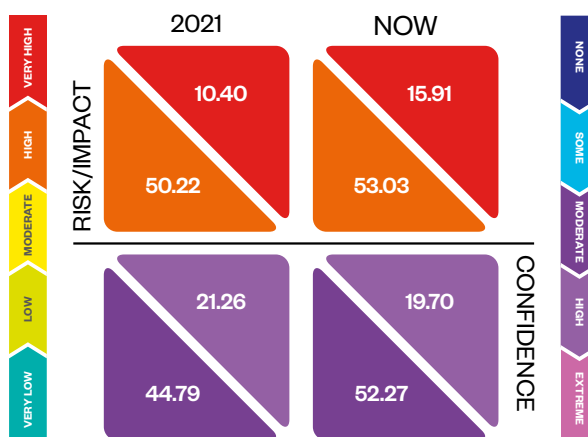


Shipowners, charterers and operators experienced significant uncertainty about incoming regulations during the period of the survey, with the focus on new carbon intensity reduction measures which entered into force in November 2022. For the second year in a row, respondents have continued to see regulations as the leading factor impacting operations.

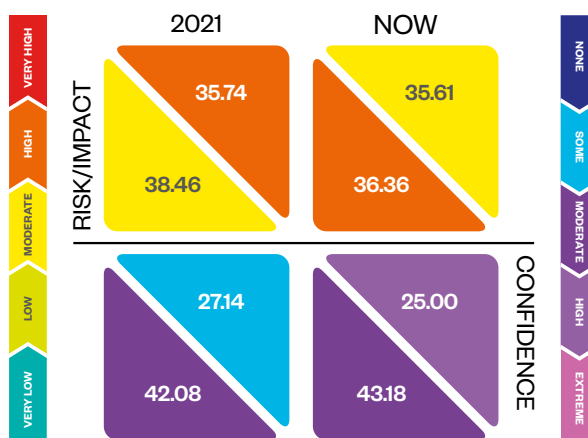
However, confidence in the ability to manage regulations appears to have increased. Many maritime operators took proactive measures to liaise with regulatory bodies early in the year to ensure a smooth transition to compliance at the end of 2022 and the start of 2023. Some shipping companies had already begun working to exceed IMO requirements with ambitious long-term net zero emission plans for their fleets.

With the IMO carbon intensity framework proving controversial since its adoption, IMO has [pledged to review](#) the regulation metrics – creating further uncertainty. These ongoing issues are likely to strongly influence how industry respondents choose to view the impact of regulations in the next survey.

### Investor Requirements



### Consumer Pressure



Wider awareness of sustainable business practices is creating pressure on the maritime sector to meet evolving investor and consumer expectations. ESG targets are increasingly becoming more common in the maritime world, and seem likely to influence both access to funding and public perception of industry performance. Although there are no official or established structures for ESG reporting in the maritime world, many parts of the sector have shown a willingness to embrace the myriad of metrics being put forward.

Barometer respondents were wary of both these ESG related issues, but investor requirements are an increasingly important issue given current concerns about accessing funding in the midst of the post-pandemic economic downturn. A [report from PwC](#) indicates that 79% of global investors consider

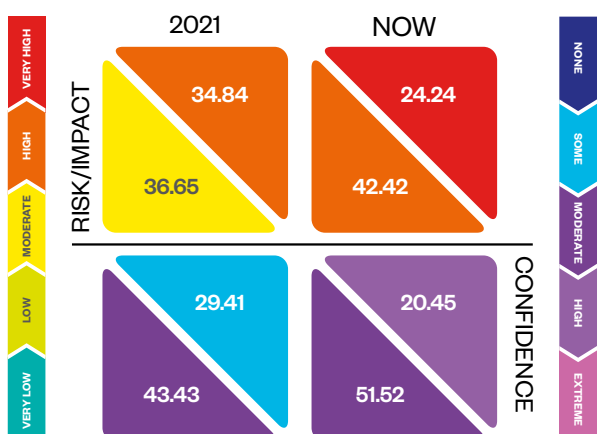


ESG risks and opportunities an important factor in investment decision making and 49% would sell their investment if a company is not showing enough action to address ESG issues. As these attitudes become more commonplace, maritime will need to comply with investor expectations if it is to retain access to affordable finance.

Many organisations, including [ports](#), are working to track their carbon emissions. Initiatives such as the [Poseidon Principles](#) for financial lending and marine insurance, the [flurry of ESG guidance](#) as well as a visible appetite from both [individual companies](#) and [governments](#) to meet net zero targets are driving the understanding for change. It is thus not surprising that many respondents to the Barometer survey displayed a high level of confidence in their ability to manage these green transition issues.

However, not all C-Suite leaders are as optimistic. An anonymous response to the ICS Barometer warned that “ESG risks are hugely undervalued or not understood at all” – emphasising the fact that this is still an emerging area for our industry.

### Market-Based Measures / Incentives to address the Climate Impact of Shipping

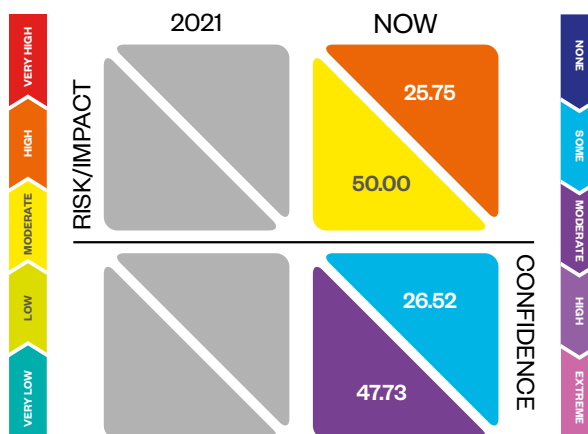


Market-based measures ([MBMs](#)) – or economic carbon pricing measures as they are generally referred to at IMO – will almost certainly be an important tool for meeting decarbonisation targets, making this a growing risk to be taken into account by the maritime sector. Respondents view this as one of the highest impact issues on the green horizon, although they are increasingly confident in their ability to address this

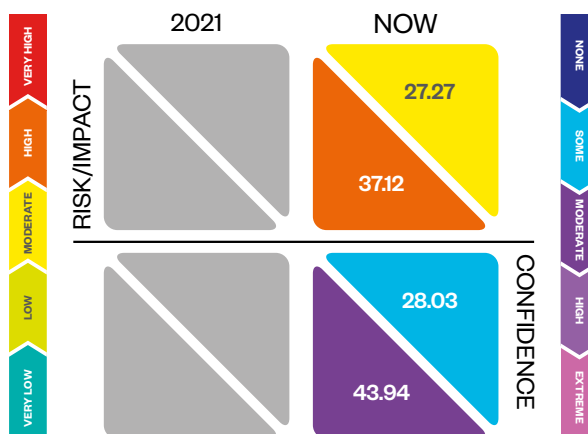
issue – possibly because of the extended conversations taking place to shape these measures.

Provided that IMO is able to make progress on a global carbon pricing measure for shipping so that clarity is provided about the economic impacts, market confidence is likely to further increase. There are a growing number of regional and even national policies – ranging from EU Emissions Trading System (EU ETS) to mandatory schemes under consideration in South Korea, the UK, Japan and the United States of America – which could lead to increased uncertainty for shipping if they are not aligned and create an increased financial and administrative burden on the industry and its workers. It is thus unsurprising that the risk for this factor is seen as higher, with an aligned reduction in confidence to manage the impact.

### Just Transition



### Availability of Crew and Trained Personnel





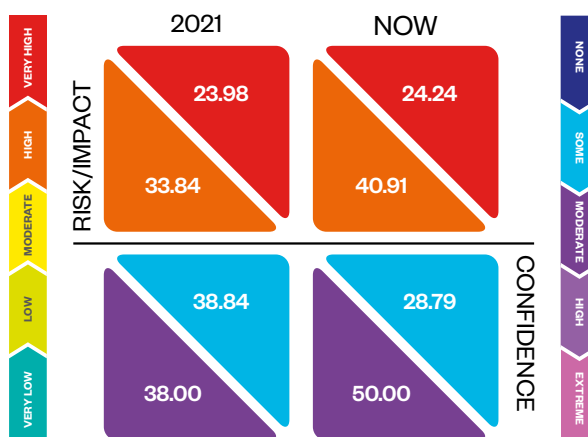
The concept of a Just Transition is [new to the maritime sector](#), with a high-profile [taskforce](#) spearheaded by ICS, International Transport Federation (ITF), United Nations Global Compact (UNGC), International Labor Organization (ILO) and IMO being introduced towards the end of last year, after the closing date for this survey. However, this factor holds the potential to significantly influence maritime’s operating landscape if it secures a foothold – given that it spans training, technologies, economic impact, policy formation and more. Respondents understandably displayed uncertainty about the potential impact of this trend at the time of the survey and reported low confidence in managing its impact.

As more information emerges about this people-centric initiative - whose early activities have included an [initial 10 point action plan](#) for the Just Transition and the associated [DNV report on seafarer training](#) – the ICS Maritime Barometer will be able to better track this new influence. One finding from the DNV research is that as many as 800,000 seafarers will require carbon upskilling by the mid-2030s, adding to significant crewing pressures facing maritime operators.

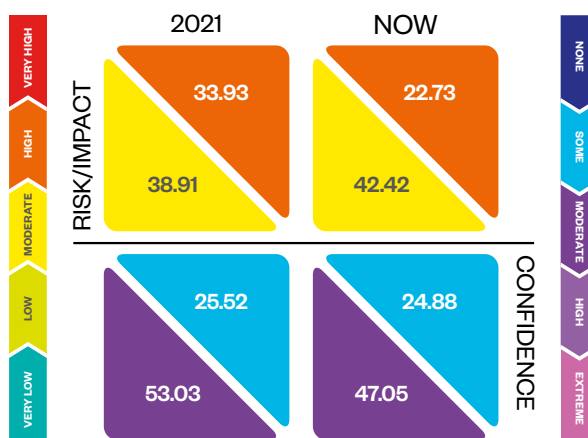
The industry already faces a shortage of qualified senior officers — an issue noted not only by [ICS](#) (which estimates that approximately 90,000 senior officers will be needed to operate the world’s fleet by 2026) but also in the [latest ICS/BIMCO Workforce report](#). Crewing was an area of concern prior to the outbreak of COVID-19 but the pandemic has exacerbated recruitment and retention challenges, not least because of its severe impact on seafarer rights.

Maritime leaders viewed crew availability as a high impact factor, with comparatively lower confidence in their ability to manage it. The coming years will see an increased focus on diversity, recruiting not only more [women](#) but also from a wider range of seafarer nationalities, making this section one to watch.

### Public Funding



### Private Funding



Given the scale of the impending maritime decarbonisation transition, respondents indicated concerns about access to funding, particularly in the face of growing global economic uncertainty and [potential recession](#). Respondents see direct links between market instability and geopolitical uncertainty and public and private funding — and consequently, our sector’s ability to achieve 2030 and 2050 aims. An anonymous respondent pointed out that decarbonisation “can only be managed in conjunction with increasing stability in the market”.

The maritime sector competes for funding with other sectors whose emission reduction efforts will contribute to meeting their country’s commitment to the [Nationally Determined Contributions \(NDCs\)](#), unlike seaborne transport, which remains outside most individual countries commitments to the [Paris Agreement](#). This



could increase reliance on more expensive private funding, which creates pressure to deliver returns on investment, often within a short period of time.

Some governments are aware of the necessity of maritime transportation for access to fuels and technologies to decarbonise, and have pledged to develop key port infrastructure, potentially accounting for the slight rise in respondents' confidence for public funding. In 2022, the U.S. Congress passed the [Inflation Reduction Act](#), pledging USD\$369 billion to tackle climate change and reduce national emissions by 50% (compared to 2005) by 2030. The Shipping Ministry of India announced a [green port project](#) in March 2022, intended to reduce CO<sub>2</sub> emissions in the shipping industry.

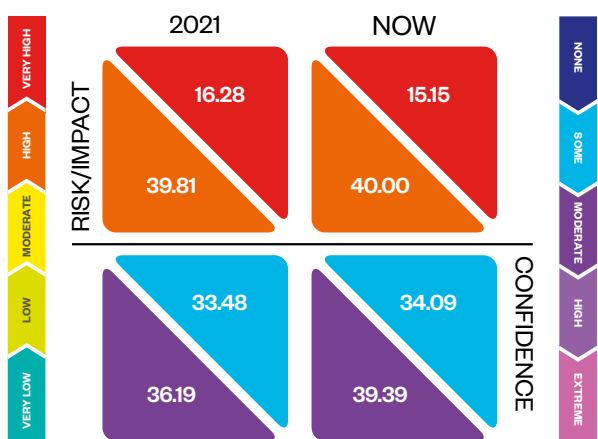
In the short term, shipping is likely to rely on private funding, which has risen on the radar of respondents, alongside growing confidence in their ability to secure private funding. This may be due to the regulatory landscape necessitating decarbonisation initiatives, thereby making this an accepted cost of business. With [guidance about ESG-focused investments in shipping](#) from consultancies like Deloitte and [shipping law firms like Norton Rose](#), as well as initiatives like the [Poseidon Principles](#), it is clear that climate considerations are increasingly important to lenders – and early adopters of green technologies and environmentally friendly ships are [expected to benefit commercially](#).

result of decarbonisation trends, other factors have assumed higher positions on maritime leaders' radars. Although the risk of vessels becoming obsolete ahead of their planned lifetime continues, leaders are more focused on regulation, funding and carbon pricing measures.

One of the reasons for this confidence could be technology that allows vessels to remain compliant. In their paper '[Understanding the Scale of the Stranded Assets Risk in the Shipping Industry](#)', researchers at University College London's UCL Energy Institute suggest that the industry should continue to invest in conventionally fuelled ships that are designed for retrofits to zero-carbon fuels when they become available – as opposed to ordering new vessels that will only run on fossil fuel.

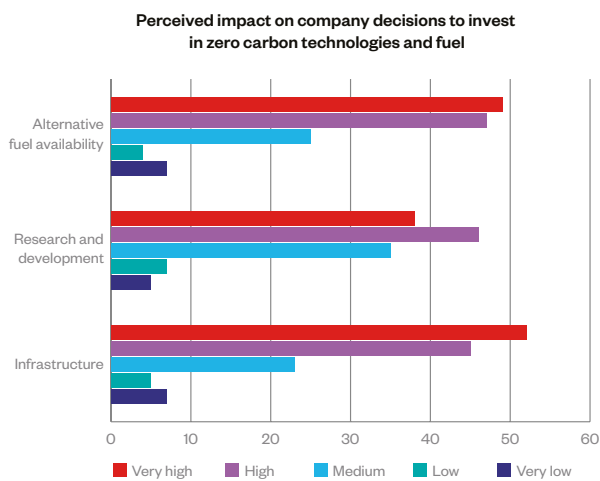
The growing market for bridging solutions to assist in greening existing operations in 2022 suggests this is already on the radar for shipping. Fuel saving technologies, wind assisted propulsion, hybrid fuel possibilities, and AI-assisted solutions for route planning are all estimated as solutions that could potentially extend the operational period of existing vessels and limit immediate impact on fleets – bolstering confidence.

### Stranded Assets



An interesting observation in this year's report is that although respondents continue to hold stable risk and confidence levels for assets becoming stranded as a

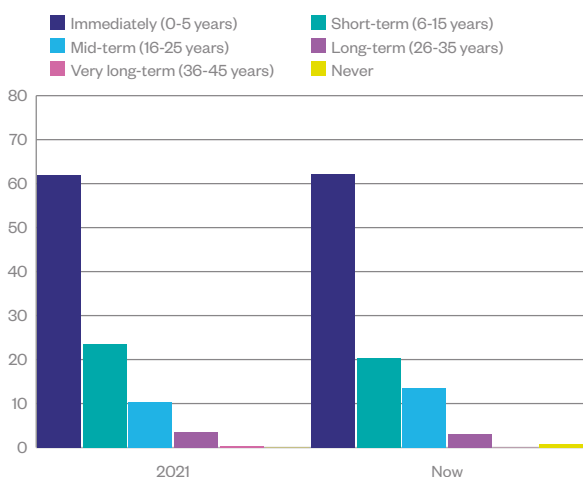
### Investment in Zero Carbon Technologies and Fuel



Across the board, respondents felt infrastructure, research and development, and fuel availability would significantly impact their business decisions and willingness to invest in cleaner operations and reduced emissions. This closely echoes responses to the 2021 ICS Barometer survey.



**How quickly do you think progress is needed on R&D investment to develop viable zero carbon technologies and fuels to encourage wider uptake of zero carbon technologies in maritime?**

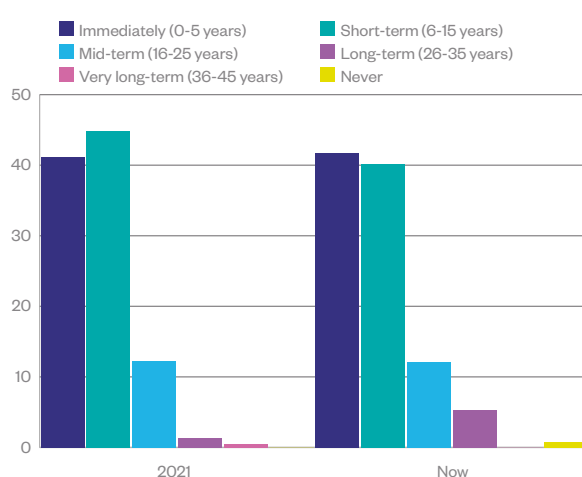


As the chart demonstrates, there is strong demand for immediate investment in R&D, which reflects industry concerns that deadlines to comply with emission regulations are fast approaching and choices of fuels and technologies remain limited - and often prohibitively expensive. Given unresolved discussions about carbon pricing for shipping and growing economic uncertainty, particularly around public funds, the urgency expressed by respondents is unsurprising. However, it should be noted that there are pockets of pushback about such investment being funded primarily by the industry.

A particularly interesting data insight is the leap in focus for mid-term investment, with the timeline of 16-25 years for this category accounting for the transitional period between 2030 and 2050, which are fixed points on shipping’s regulatory decarbonisation timeline. Respondents are likely braced for a large shift in operations in order to meet IMO targets as well as regional regulations, which may be more stringent.

Infrastructure for fuel availability at ports is an [urgent concern](#) for maritime leaders, with data from both years displaying a concerted desire for immediate and short term progress. Port infrastructure is not only costly to develop and time consuming, but often dependent on support from national governments, making the timelines particularly important.

**How quickly do you think progress is needed on infrastructure – such as fuel availability in ports – to encourage wider uptake of zero carbon technologies in maritime?**



There is also a paradox in play, with ports holding off on decisions about specific infrastructure ahead of confirmed market demand by shipowners, who in turn are reluctant to commit to specific fuels and technologies until access to bunkering and supporting infrastructure has been confirmed. However, the port sector, led by the International Association of Ports and Harbors (IAPH) and the World Port Climate Action Programme (WPCAP), are attempting to bridge the conversational gap via the creation of the [Port Readiness Level for Alternative Fuels for Ships \(PRL-AFS\)](#) tool. This tool creates a systematic approach to align supply, demand, infrastructure demand and policy, thereby creating a singular timeline for cross-sectoral stakeholders.

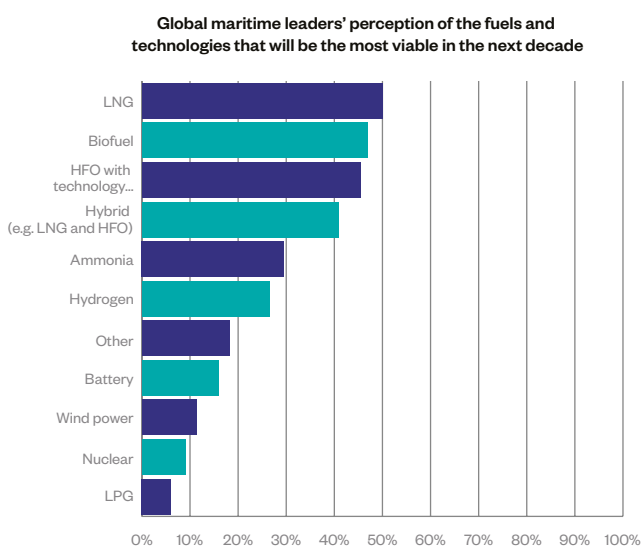
**How quickly do you think progress is needed on alternative fuel availability – with competition in existing markets for resources and production – to encourage wider uptake of zero carbon technologies in maritime?**



Respondents have demonstrated a similar urgency for access to alternative fuels, which are a vital component of maritime’s decarbonisation transition. Shipping is expected to have to [compete for resources to achieve national carbon reduction](#) targets, further fanning the flames of uncertainty about the future operating landscape. Analysts are predicting that [significant investment is required](#) to underpin this transition, which has regulatory markers fixed for 2030 and 2050. This would explain why maritime leaders are focused on the immediate future – with little interest in the long term at this point.

The fuel landscape is incredibly fragmented, with respondents demonstrating rapidly changing views year on year about the future. In the coming decade, respondents expect to see the continued use of fossil fuels, which account for three out of the top four fuel choices – the only outlier is bio fuel, which ranks second to LNG. As noted in the 2021 ICS Barometer survey report, these numbers may indicate confidence in existing fuels, but they may also indicate a reluctance to shift away from those investments.

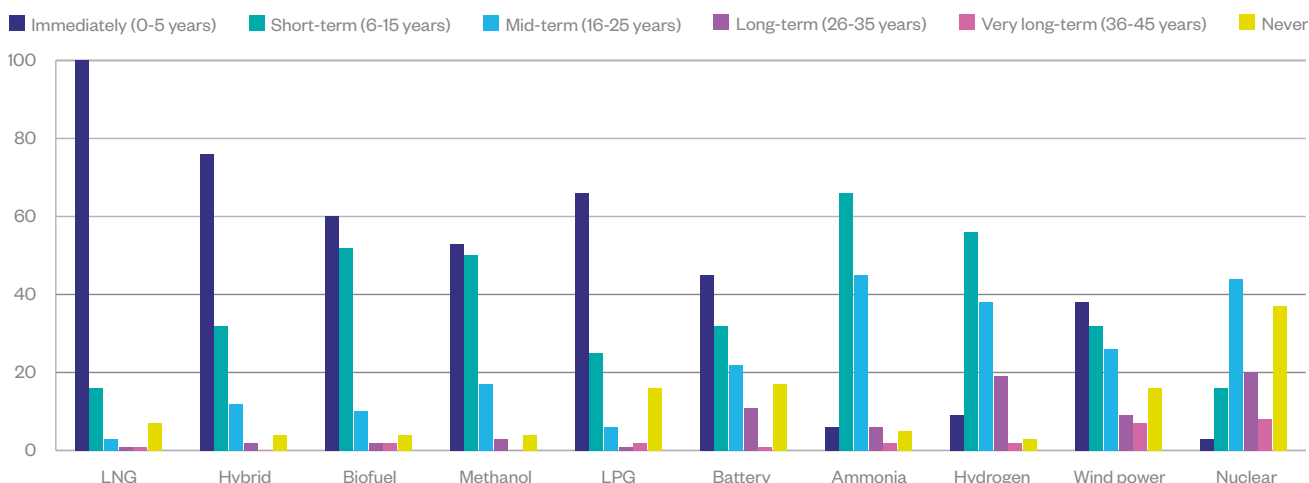
### Fuels and Technologies



Despite respondents assuming that fossil fuels are likely to be largely phased out in the short term, about 40% of respondents believed that fossil fuel use in maritime would continue into the mid-term, with a further 27% believing it is likely to continue for the long term (26-35 years). This suggests a discrepancy between when maritime leaders foresee low-carbon fuel and technology becoming available and when they are adopted.

An anonymised respondent noted: “HFO and VLSFO are fuels that are almost exclusive to shipping, whereas all alternative fuel options will see shipping in competition with other sectors of the global economy.” They pointed out that availability would be a key consideration under these circumstances, and this likely plays a significant role in the belief in shipping’s continued reliance on fossil fuels and bridge fuels. This hesitance to divest from fossil fuels could pose a problem for maritime’s ability to reduce emissions and achieve its targets in 2030 and 2050.

### Perceived timeline on use of fuels



Ammonia continues to lead over hydrogen by a fraction, and both are assumed to become more viable in the short and mid-term. Methanol is also popular with respondents, which is understandable given Singapore’s plan [to establish the first green e-methanol plant in Southeast Asia](#) and Maersk’s [fleet investment](#). DNV has suggested that, at least initially, methanol has the potential to be adopted on board smaller vessels due to its comparatively simple engineering and design requirements (although it does present significant safety challenges, as do alternative fuels such as ammonia and hydrogen).

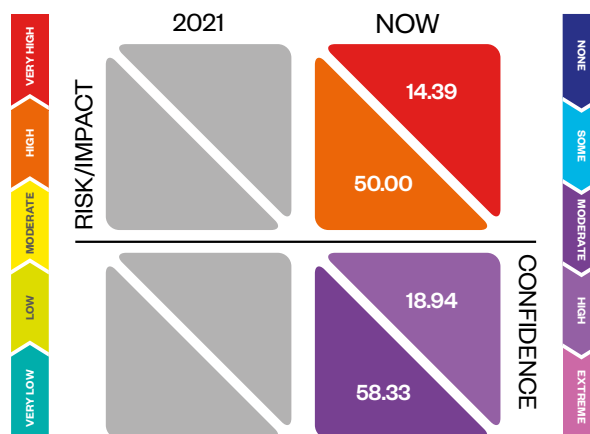
Unlike LNG which – with the exception of synthetic LNG (methane) – is generally seen only as an interim fuel, batteries were seen by some respondents as viable both immediately and in the long term for smaller ships or those engaged in short sea trades, corresponding with [a rise in OSVs retrofitted with batteries](#). While certain respondents noted they were unlikely to ever use this technology in its current iteration, they specified that this would be due to the constraints of their sector.

An interesting finding is growing support for wind power (as a complement to other solutions), which was previously in last place among these fuels and technologies in 2021, is now seen by some as more viable than LPG and nuclear energy. This [growing willingness](#) to consider wind-assisted propulsion and its hybrid solutions could be attributed to fuel cost volatilities related to ongoing geopolitical uncertainty, increasingly strict emissions requirements, or demonstrable prototypes entering the market from late 2022. Notably, respondents assume wind power is likely to remain in use across the estimated timeline, with only a few noting that their specific sector is unlikely to venture into wind propulsion.

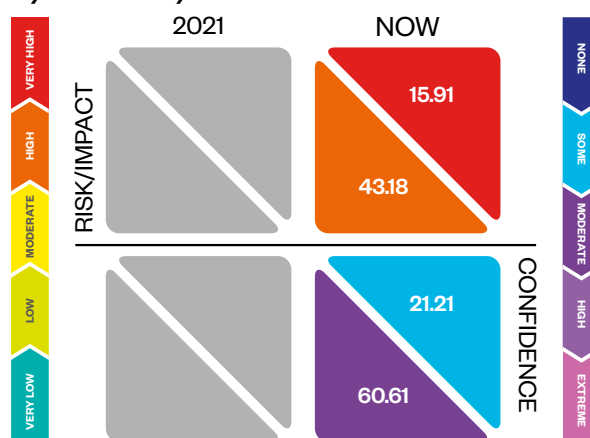
Nuclear has also seen more positive attention than in 2021, with respondents seeing use in the mid and even short term – although there continues to be significant resistance with a large set of respondents believing that they would never use this power source.

## Digitalisation, Automation, Hybrid and New Technology

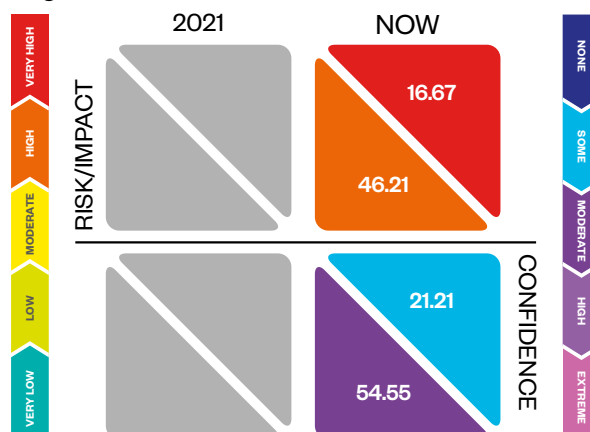
### Human element



### Cyber security



### Regulations



The COVID-19 pandemic appears to have accelerated shipping’s digitalisation progress and innovation. Artificial Intelligence, big data analytics, sensor technology and satellite communications are transforming shipping from an analogue industry to a fully interconnected ecosystem. There is risk in adopting technology early, but first movers can gain significant competitive advantage.

Technologies considered innovative in the maritime sector are often proven in other industries, saving on R&D costs and expediting implementation – although adapting solutions for the particular demands of marine applications is crucial as this is a unique operating environment.

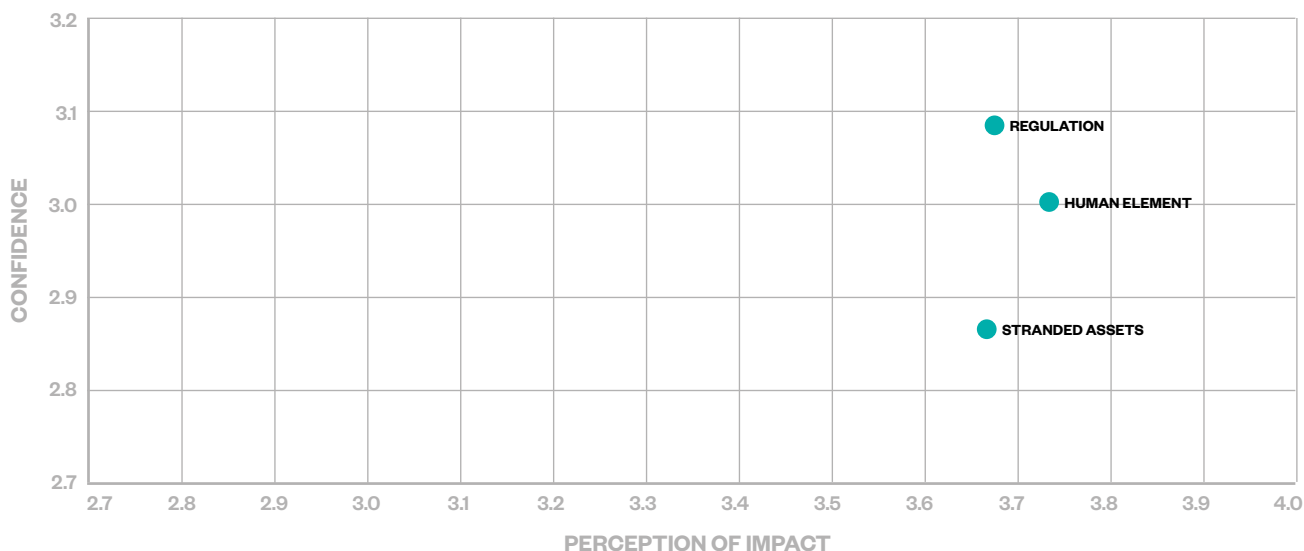
In a new section for the ICS Barometer Survey, respondents were asked about the anticipated impact of cyber-attacks, human element issues and regulation on the progress of Digitalisation, Automation, Hybrid and New Technologies.

Human element factors, such as how staff interact and cope with the increase of technologies in daily work at sea and ashore, were thought likely to have a significant impact on a respondent’s segment of shipping – although confidence remained relatively

high. This may reflect the long lead time to develop new regulation through STCW. However, for the foreseeable future human intervention will be required to manage the risks associated with digitalisation to ensure safety is not compromised.

Reflecting similar concerns to the cyber security risk explored earlier in this report, cyber-attacks were perceived as potentially having a ‘high’ impact, although confidence was notably lower. Although regulations were also seen to have a ‘high’ impact, the timeline for regulations to be considered and come into force likely accounts for respondents displaying a ‘very high’ confidence in their ability to address the impact on their maritime sector.

**Global maritime leaders’ perception of factors impacting Digitalisation, Automation, Hybrid and New Technology**



## SECTION 3

# Conclusion and Annexe

## LEADING RESPONDENTS

### **24** United Kingdom

Key risks identified:

- Political instability
- Financial instability
- Cyber attacks

### **14** The Netherlands

Key risks identified:

- Administrative burden
- Financial instability
- Political instability



## Conclusion

The ICS Maritime Barometer has captured a snapshot in time for the maritime industry, illustrating the flow of global issues impacting sectors – with the ongoing political and economic turmoil rippling across the responses of maritime leaders. Their uncertainties are palpable, particularly in the decarbonisation and fuel section, highlighting the need for a clear plan of action to mitigate risk.

There is no doubt that individual sectors will have varying priorities, but there are clear launch points for movement. The highest factors on respondent's radars (political instability and regulations) are both driven by governments, making this an obvious arena for greater efforts by the industry. Although financial instability may be outside leaders' ability to control, industry reputation (as a meeting point for investor relations, consumer

pressure and access to funding) would be an area worthy of focus. Crewing and skill concerns, as reflected in this report and within wider industry discussions, would also benefit from attention as this is a rapidly evolving issue.

As the ICS Maritime Barometer becomes an established component of the industry's annual reporting cycle, it will generate a significant amount of data. This will inform trend analysis and highlight overlaps and differences between individual sectors, geographical locations and even specific groups of stakeholders.

Data is an extremely valuable tool, but requires focused action to bring about progress. We invite readers to use the insights from the ICS Maritime Barometer Report to inform their discussions, underpin negotiations and deliver the results that will secure our collective future.





# Annexe

## Methodology

The ICS Barometer survey was conducted by Intent Communications Ltd, on behalf of ICS, in summer 2022. 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 132 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 also law firms.

While a majority of respondents had their primary region of business operations in the UK and the EU, the ICS Barometer survey saw significantly increased responses from Asian countries including Singapore and Japan, as well as an uptick in respondents from North America. Future reports will continue to strive to ensure balanced regional representation for analysis of priorities and risk.

The ICS Barometer survey covers three primary topics: risk, resilience and future-proofing (consisting of 11 key points), decarbonisation, fuels and emissions (nine points), and new technologies (three points). 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 compared with data gathered from 221 respondents in the 2021 pilot ICS Barometer Survey to track trends and shifts in perception among anonymised respondents.

Each risk map provides a visual snapshot of where current estimates locate risk or 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).

It should be noted that although respondents shared their view on a single factor (eg: whether they viewed switching to alternative fuels as a risk that would

impact their sector - ranging from 'low' risk through to 'very high' risk), in the real world, the perception of a risk factor may change if it is compounded by other factors. For example, rising consumer pressures, investor requirements for ESG, and impact on industry reputation could potentially influence each other. As such, a risk factor which is ranked as a 'medium' to 'low' risk when thought of independently, may in fact be considered more serious when looked in the context of one or more separate risks.

It is important to stress that levels of risk and confidence may fluctuate in response to serious incidents, like the effects of the pandemic in 2021 and the war in Ukraine in 2022, year-on-year. Furthermore, the confluence of issues – such as a global recession and increased geopolitical uncertainty – may compound perceived risk.

Each map of industry perception provides a visual snapshot of where current estimates locate risk or 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 global and regional maps 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). Once the data was received, weightage 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 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.



### Diverse respondent voices

The survey was initially sent to selected associations\* and some individuals by email, before widening to include responses from industry leaders beyond shipowners, operators and managers. This followed feedback gathered by the Barometer team regarding the need to represent views on risk and decarbonisation from stakeholders who also play vital roles in the industry’s status and ability to deliver on decarbonisation. A key example is the Philippines, a primary source of seafarers for the industry while not as large a stakeholder in vessel ownership. 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 prioritised in future editions of the ICS Barometer survey.

\*The ICS member and associate member associations that were requested to disseminate the pilot survey included The UK Chamber of Shipping, Hong Kong Shipowners’ Association, Union of Greek Shipowners, Japanese Shipowners’ Association, Russian Shipowners Association, Chamber of Shipping of America, Swiss Shipowners’ Association, Danish Shipping, The Royal Association of Netherlands Shipowners (KVNR), Armateurs de France, Finnish Shipowners’ Association, Cyprus Shipping Chamber and Union of Cyprus Shipowners, The Liberian Shipowners’ Council (LSC), CLIA, CONFITARMA (the Italian Confederation of Shipowners), the Russian Chamber of Shipping, Cruise Lines International Association (CLIA), Asociación de Navieros Españoles (ANAVE) - Spanish Shipowners’ Association, Chamber of Shipping of America (CSA), The Filipino Shipowners Association (FSA), Norwegian Shipowners’ Association, Grupo TMM, Turkish Chamber of Shipping, Maritime Industry Australia Limited, Faroe Islands National Association Secretariat, Verband Deutscher Reeder (German Shipowners’ Association)

Other bodies approached include the International Association of Ports and Harbors (IAPH), International Union of Marine Insurance (IUMI), International Association of Classification Societies (IAOS), Global Shippers Forum (GSF) and Chamber of Marine Commerce.

## Country focus: The United Kingdom

The United Kingdom accounted for 24 of the 132 responses received for the ICS Maritime Barometer Survey, the highest participation from a single country. A snapshot of the opinions of UK respondents is illustrated below:

Many of the concerns are shared by respondents from other countries, with the risk profiles overlapping completely as well as the confidence levels for decarbonisation transition factors. However, a notable difference in confidence levels is that of both, supply chain instability and barriers to trade. This may be a

result of the UK’s decision to leave the EU, which has fundamentally reshaped the UK trade landscape.

For the impact analysis, there is again a lot of overlap in factors, with a key shift being the concern about private funding, which is higher in this geographical location than in others. This may be linked to the UK Government’s Net Zero policy, which will require significant funding to achieve. Although the government has announced a number of [public sector grants](#), competition is fierce and many companies have assumed that private sector funding would be needed to [meet the costs](#).

Key risk factors	Lowest risk confidence	Key impact factors	Lowest impact confidence
<ul style="list-style-type: none"> <li>Political instability</li> <li>Financial instability</li> <li>Cyber attacks</li> </ul>	<ul style="list-style-type: none"> <li>Supply chain instability</li> <li>Political instability</li> <li>Barriers to trade</li> </ul>	<ul style="list-style-type: none"> <li>Regulation</li> <li>Private funding</li> <li>Market based measures</li> </ul>	<ul style="list-style-type: none"> <li>Public funding</li> <li>Just transition</li> <li>Stranded assets</li> </ul>





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## ICS Maritime Barometer Report 2022-2023

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